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"AIR POWER," VOL. I.

FROM No. 1 (OCTOBER, 1953) TO No. 4 (SUMMER, 1954)

The first volume of AIR POWER (which incorporates THE ROYAL AIR FORCE QUARTERLY) has continued to cover a very extensive field of subjects of a carefully selected range, aimed at appealing to the equally varied interests of its readers in all parts of the world. Among these we have regular subscribers in the following countries: The Argentine, Brazil, Belgium, Denmark, France, Germany, Holland, Indonesia, India, Norway, Spain, Sweden, Switzerland, Turkey, Thailand, U.S.A. and U.S.S.R.: in addition to a larger circulation in Australia, Canada, New Zealand, Pakistan and South Africa, with the continued support of the majority of members past and present of the Royal Air Force and numerous naval, military and civilian subscribers interested in keeping abreast of the influence of air power in the world today.

The following selected list of contributors to the first volume of AIR POWER is adequate proof that we have maintained our editorial policy of providing a wealth of information on military air affairs by authoritative authors, as well as contributions from lesser known, but nevertheless interesting, writers from among the younger students of modern air power:

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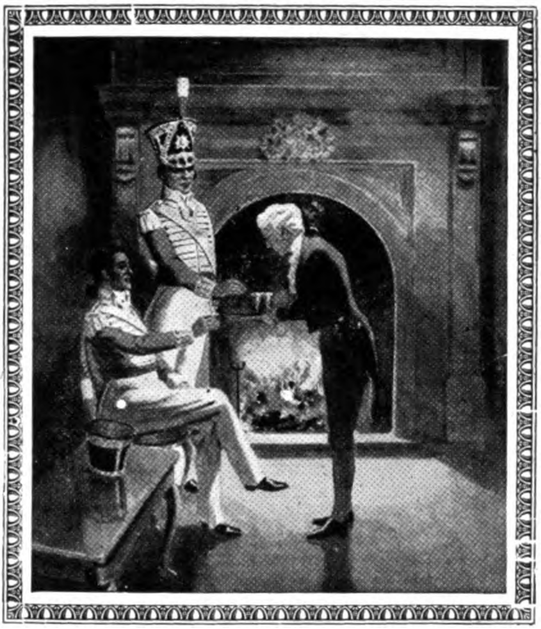

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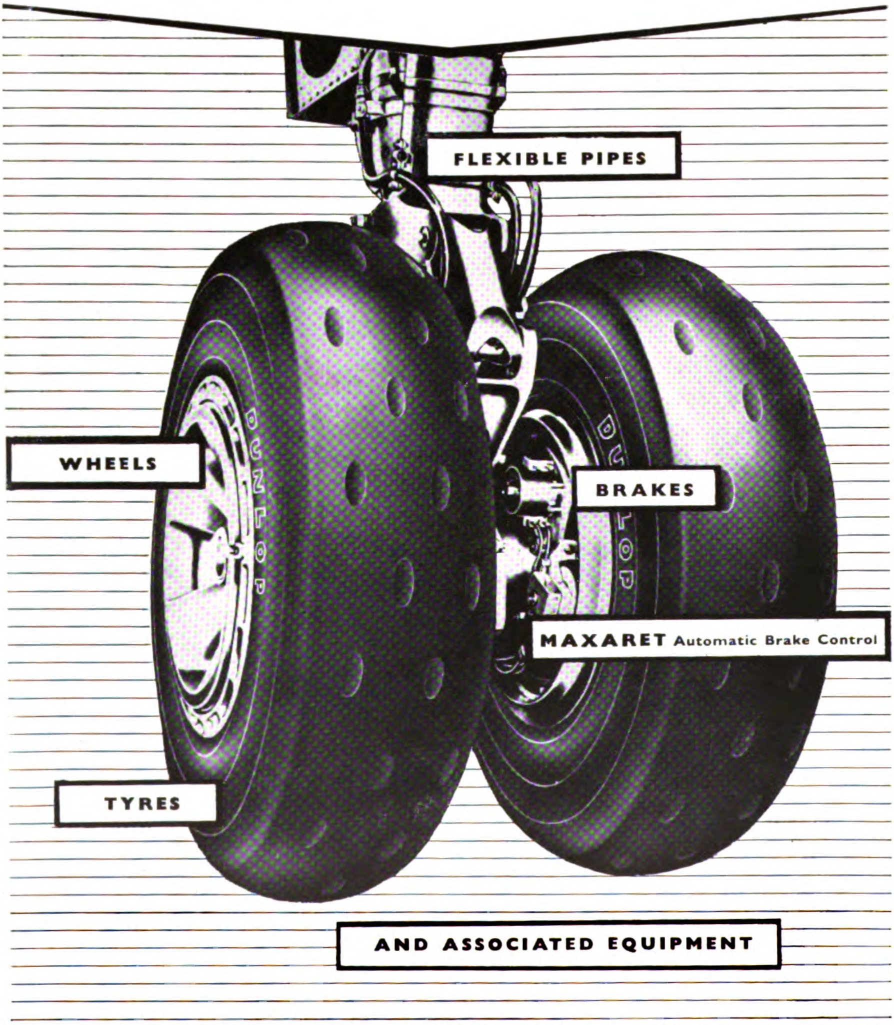

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EDITOR.

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MESSAGE TO "AIR POWER"

From

MARSHAL OF THE ROYAL AIR FORCE
THE VISCOUNT TRENCHARD, G.C.B., O.M., G.C.V.O.,
D.S.O., D.C.L., LL.D.

"I am glad to see that 'The Royal Air Force Quarterly' is to be known in future as 'Air Power.' Perhaps this will help to emphasize the fact that you can have Air Forces without having air power. It is important that the true elements of air power should be widely understood, and that we should recognize that the old days, when we lived in an island guarded by the Royal Navy, have gone for ever.

"There is a tendency to pay lip service to the supremacy of air power without in the least realizing the consequences that flow from that supremacy. Our people must be brought to understand the profound change that has occurred in our military situation, and that if we are to survive we must be as vigilant to ensure that we possess true air power, as in the past we anxiously cherished our sea power.

"In this vital task 'Air Power,' with its wide circulation throughout the Commonwealth, can play an important part.

"I wish it well in this great endeavour.

Trenchard

"27th August, 1953."

MESSAGES FROM CHIEFS OF THE AIR STAFFS :—

From

AIR CHIEF MARSHAL SIR WILLIAM F. DICKSON,
G.C.B., K.B.E., D.S.O., A.F.C.
Chief of the Air Staff, Royal Air Force.

"On its change of title I send 'Air Power—The Air Forces Quarterly' the best wishes of the Royal Air Force with the hope that it will be of real benefit in maintaining close relations between the Commonwealth Air Forces and in advancing the professional and general understanding of Air Power."

From

AIR MARSHAL C. ROY SLEMON, C.B., C.B.S., C.D.
Chief of the Air Staff, Royal Canadian Air Force.

" 'The Royal Air Force Quarterly and Commonwealth Air Forces Journal' has served as an interesting and valuable aid in keeping abreast of many developments and ideas of the various Commonwealth Air Forces. I feel that it has a definite value in increasing the understanding amongst the Air Forces of the Commonwealth and of our allies.

"I am glad to be able to pass my good wishes on to your magazine under its new name of 'Air Power—The Air Forces Quarterly.' I hope, too, that it will achieve even more success in promoting understanding among the Air Forces of the Commonwealth and of those nations allied with us in resisting aggression."

From

AIR MARSHAL SIR DONALD HARDMAN, K.C.B., O.B.E., D.F.C.
Chief of the Air Staff, Royal Australian Air Force.

"I am delighted to have this opportunity of wishing 'The R.A.F. Quarterly' continued success in the future under its new title of 'Air Power.' We shall all miss the old name with which we have grown up, but the new one is a better and more descriptive title for a periodical whose editorial staff and regular contributors have consistently shown such a clear understanding of the true meaning of air power and who have done so much to interpret it to their readers."

From

AIR VICE-MARSHAL D. V. CARNEGIE, C.B., C.B.E., A.F.C., R.A.F.
Chief of the Air Staff, Royal New Zealand Air Force.

"You have the full support of the R.N.Z.A.F. in any move designed to perpetuate the close integration of the Commonwealth Air Forces. We for our part feel so much an offspring of the R.A.F. that we have never been conscious of any possibility of neglect by the Service from which we have sprung and whose leadership we continue to follow.

"Despite our differing problems we have a common aim and the value we can mutually obtain from an interchange of ideas through the medium of the Journal is most important in time of peace when integration cannot be complete."

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EDITORIAL

THE PRIORITY OF AIR DEFENCE

IT is an unpleasant truth that complete protection from an air attack is impossible. The amount of protection depends upon the *size* and *efficiency* of a nation's air defence. The *size* is limited by the money and manpower available. Its *efficiency* is dependant upon the inventive genius, craftsmanship, materials, industry, standard of training and morale of her people.

Britain, as the advance bastion of Western air defence, has urgent need for the most efficient and largest air force that can be provided, as the full brunt of any onslaught would undoubtedly fall upon her.

There could be no greater folly than to underestimate the size or efficiency of the potential enemy's air force. In size the Soviet's air strength is greater than the sum total of the air forces of all the Western Powers. The efficiency of her aircraft is of a very high order, contributed to greatly by the genius and craftsmanship of the nations she has over-run. Her industries' output has been stepped up beyond those of the free nations, by her ability to employ forced labour. The Korean war has proved that Russian fighter aircraft in design and performance are at least equal to those with which most of our squadrons are armed today. Although she has hitherto concentrated chiefly upon fighter aircraft and those for close tactical support, she is now building a large strategical bomber force. In size she is clearly formidable. Under operational conditions the over-all efficiency of this vast air force is a matter for speculation.

With the impossibility of matching the Soviet air force in size, our defence against air attack must depend upon our possessing a more efficient air force of adequate size for the job, remembering that it was proved in the Second World War that a numerically superior attacking force can be defeated by a much smaller one with better aircraft and more highly trained men.

Never before has the need for adequate air defence been so vital. The President of the United States of America (Dwight D. Eisenhower) recently stated: "Today twenty-five aircraft equipped with modern weapons can—in a single attack—visit upon an enemy as much explosive violence as was hurled at Germany by our entire air effort throughout four years of the Second World War."

The British Aircraft Industry, both in inventiveness and craftsmanship, leads the world today. The high standard of training that can be reached was amply demonstrated by personnel of the Royal Air Force at the Royal Review at Odiham in July last. Are we giving Air Power its full recognition and support, or are we diverting much of our resources in money and skilled manpower into other channels not so vital to our security?

Those who follow closely the development of Air Power realize its possibilities, the danger of underestimating them and the fate that awaits any nation which fails to develop to the full its air defence.

In the present international situation, with the very real threat of war overshadowing and stultifying the peaceful pursuits of every nation, *the danger does not come from vast armies or naval strength*; their very existence would be shortlived without an air force capable of giving them reasonable immunity from the devastating destruction of modern air power.

Today, as never before, the danger lies in the strength and efficiency of the enemy's air force.

Are we again planning a possible future war based upon the experiences of

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the last one, possessing as we do full knowledge of the development of science and modern weapons, only to learn the folly of this when casualties mount and the lack of foresight has brought us to the brink of defeat?

We venture to suggest that in some quarters this folly still exists; as has been shown by recent debates in Parliament. There are those who can still get public hearing and its consequent wide publicity, who through ignorance or professional Service jealousy belittle the modern capabilities of Air Power and advocate a kind of share-out of the nation's resources to Navy, Army and Air Force, irrespective of the exact proportion of the burden that would fall upon each in any future war.

There is not a sane man who does not still hope that war may yet be averted. Should it come, there will probably be little if any warning—it will begin with an overwhelming air attack on Britain, and should this penetrate our air defences we should suffer a devastating air bombardment 100 times more terrible than Hiroshima. Should we lose this first battle, the advance bastion of the Western Powers would be occupied by the enemy, naval and army units there annihilated, and only those deployed under the shelter of other powers left to fight on, probably as auxiliaries of the U.S.A.

The main burden of responsibility for our survival if attacked rests squarely upon the shoulders of our Air Force commanders. What manner of men are they?

There is too much talk of "The Youngest of the three Services," with its implication of immaturity. Those who guide the destiny of our Air Force today are as experienced in the arts of *modern warfare* as their opposite numbers in the Navy and Army. Recognition of this was given by General Eisenhower when he appointed as his Deputy Commander a Marshal of the Royal Air Force in the Second World War. More recent appointments to command posts in the Western Powers forces have followed, but they have yet to take their proper place, appropriate to their responsibility for the major burden of our defence.

How many of these facts are widely known among our people? If they are not known, it is because of the modest silence of those struggling to build up an adequate air force in the face of serious and alarming difficulties. When others, with a wealth of knowledge of modern air power, draw attention to the need to sweep away *outmoded ideas on defence* and give the Air Force proper recognition, cynical suggestions are made that the Royal Air Force is suffering from an "inferiority complex." Nothing could be further from the truth. Our Air Force commanders know full well the grave responsibility which is theirs and shoulder the burden proudly and bravely, doing the best they can under existing circumstances.

The citizens of this country, of whatever party, should see that their representatives in Parliament ensure that the Air Force has the best scientific brains in Britain at their disposal, all the best skilled tradesmen necessary to the job in hand, speed up the supply to squadrons of the most modern aircraft that our industry can produce, and that no vested interests are permitted to slow up or cause dangerous gaps to exist in our first line of defence.

When all of this happens, we shall have "Air Power" which will not only give us reasonable defence against modern air bombardment, but equally likely to be a sufficient deterrent to the Soviet from launching an attack and enable us, at long last, to discuss peace and disarmament from a position of strength. With the mentality and expansionist ideology of the Russians it is the only position which peace negotiations are likely to be fruitful.

A POSSIBLE EAST-WEST DÉTENTE

BY J. M. SPAIGHT, C.B., C.B.E., LL.D.

IS IT A DÉTENTE?

"APRES moi le déluge," said the old French proverb. Perhaps the reverse of it was muttered regretfully by Josef Stalin, that man of blood, before his end: "Alas! No deluge if I go." If he had lived longer a storm of red ruin might have swept the world. As it is, the prospect, the near prospect at any rate, of such a calamity seems to have receded; or has it? Is the new Russian attitude to the West nothing but a subtle manœuvre to delay or stop the West's organization of its defence? Or will there really be an East-West *détente*? And will the *détente* be a lasting one? The suggestion has been made that it will be one limited to five or more years, during which the new men of the Kremlin will be able "to assimilate and develop the vast areas, resources and populations of China and Eastern Europe before they can feel confident about the outcome of an all-over conflict with the West which they most probably still consider as inevitable in the long run."[1] But in truth we cannot tell what will happen. We can only keep our fingers crossed and hope for the best. Of one thing at any rate the present writer is confident: if there is, in fact, an East-West *détente*, air power will move up into a more prominent place in the new system of mutual security and collective defence in Europe which will take the place of that which was operative when the stopping of a Russian attack upon the West was alone in question. The grounds for this belief are given later.

We in these islands are not given to going to meet trouble half-way. Usually, indeed, a war has taken us more or less by surprise. We always felt that somehow or other we should muddle through, and—somehow or other—we always did. On the other hand, we have had some scares which came to nothing in the end.

RUSSIAN SCARES

This last scare was not the first which Russia gave us. There are very old men still living who remember another of seventy-five years ago. It was not quite so bad as the French scare of 1859, when Louis Napoleon was thought to be preparing to land an army in Kent, to send his new steam gunboats up the Thames to burn down Wapping and Woolwich, and to do a number of other very unpleasant things to us. But the Russian scare of 1877-78 was genuine enough. There was not the same rush of citizens to join the Volunteers, but the country was perhaps even more boisterously vocal in its patriotic fervour. It resounded to the strains of "We don't want to fight, but by Jingo, if we do. . . ." We came very close to war with imperial Russia then. She was in one of her expansionist moods. It was not a matter then of the spreading of the Marxist ideology, of a mission to take up the Red Man's burden all over the world. She was "Holy Russia" still, though the holiness was a little patchy. Her eyes were fixed covetously upon the Golden Horn; it was only as an excuse or a pretext, covering an ulterior aim, that she championed the cause of the Christian Slavs in the Balkans and sent her troops to "protect" them from their Turkish oppressor. We intervened to save Constantinople. We sent Admiral Hornby's fleet to the Dardanelles, and the Czar stayed his hand. He had to be bought off by Turkey's cession to him of Batoum and Kars. We, too, got our little whack out of the affair; it was the island of Cyprus. Destiny, it seems, was looking well ahead when it thus decreed that Batoum should come under the Russians' rule and Cyprus under Britain's. It foresaw the day, no doubt, when the vital oil refineries at the former place, refineries not as yet thought of, might have to be attacked by air from the latter.

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[1] *Carnegie Endowment Publication*, No. 490, 1953, p. 223.

That Russian scare of Victorian days passed. Uneasiness persisted, however, in this country in the years that followed. Russia was hatching schemes, it was thought, to attack us in India via Afghanistan. The Khyber Pass acquired a new strategic importance. One can find reflections of our apprehensions in Kipling's *The Man That Was* and some of the other literature of the time. But Russia made no move. She was on her good behaviour. We had plenty of troubles in other quarters of the globe, alarms of war, actual wars, but they were not of Russia's making nor inspired by her. Perhaps history will repeat itself in this respect. The Russo-Turkish war was followed in a few years by our troubles in Egypt; is there a possible restaging of the historical drama here? The Colonel Arabi Pasha of that time seems to have been reincarnated with some differences in another Egyptian officer, of rather higher rank, in our own days. Will he have to be put firmly in his place as his predecessor was by Sir Garnet Wolseley?

THE SOVIET COLOSSUS

There have been one or two outstanding and revolutionary changes in the international scene since 1878. Russia was then but one of a number of not unfairly matched European States. Germany, Austria and France, not to mention Britain, had each a claim to belong to the same heavy-weight class. The issue of a conflict between her and any of these countries would have been by no means a foregone conclusion. How different is the situation today! Russia is now beyond question the strongest Power in Europe. No single State on the Continent could hope to challenge her with any prospect of success. There are, in fact, two super-Powers in the world today: the Soviet Union and the United States of America. That does not mean that Britain with the Commonwealth, France and the French Union, and, for that matter, to look a little ahead, a Germany unified and re-armed, will have ceased to be great Powers. It is merely that the two other Powers are now *primi inter pares*.

THE POLARIZATION OF POWER

There has been a polarization of world power. One pole is to be found in the great land-mass of Eurasia, the other in the North American Continent. Each draws irresistibly into its magnetic field the States which have a natural affinity with it. The idea that a "third force" can remain between them, unattracted by either, is an illusion. Such a "force" must inevitably fall sooner or later within the influence of the one or the other of the two centres of attraction. There is no escape from the fact that the balance of power as it now exists has become an interhemispherical one; the equilibrium that there used to be in the old world itself has been shaken and upset.

Given the predominance of Russia, there can be no real feeling of security in the other countries of Europe unless their Governments and peoples are assured that they can rely on the aid of the United States in their day of peril. They cannot stand alone; if they tried to do so, they would exist on sufferance, on the forbearance of their mighty neighbour, on the condition of the Kremlin's corporate liver. That would be an intolerable situation for the ancient and proud peoples of Western Europe; but the facts of geopolitics are inescapable. The Marxist dictator is the top dog in Europe. He may do less growling and more tail-wagging, but he will still be top dog. And he may choose to bite at any time. What will prevent him, probably, is the knowledge that there is a big stick in reserve across the Atlantic if he does.

HOPE FROM THE WEST

It is out of the West that a ray of light and hope comes. Nothing in the world today matters as much as the fact that the United States has abandoned her policy of isolationism. The entangling alliances which the Founding Fathers feared are no longer the bugbear that they were. On the contrary, they are seen to be contributories to the United States' own security. The great Republic has taken its rightful place as the leader of the free world. In Korea its sons have shown that they are ready to die for the faith that is in them. It was the faith for which their forbears fought at Lexington and at Gettysburg, the faith of free men. And in Korea the quarrel was not their own.

This change in the foreign policy of the United States is the major international event of our time. It will be followed by other changes. The settlement of the German question will necessitate a re-surveying of the whole field of Western defence. The pattern of the defence which has been organized has been dictated by the fear of the invasion of the West by the Russians on a line which will no longer be the same when Germany is united and free—an invasion which might come in the very near future. The line on which contact would be made is one running down through Germany from north to south. It will clearly have to move eastward if and when Germany is unified. When she is, there may be no foreign forces of occupation in Germany. If the Russians withdraw from their present zone in the East—and that will assuredly be a condition of any settlement—it is inconceivable that the Western Powers will be able to retain the right to occupy their zones in the West. Obviously, then, the present plan of defence will have to go into the melting pot. (Incidentally, a lot of high brass will be sizzling in it, too!)

It is practically certain in any case that if and when a German peace treaty is concluded, the reduction of the forces now being maintained in Europe will be demanded by public opinion in the United States and Britain and probably in other contributing countries, too. The forces are kept in Europe under the terms of the Tripartite Declaration of 27th May, 1952, in which the Governments of France, the United States and Britain stated their intention to maintain them for the joint defence of the North Atlantic Treaty area. The situation in which this promise was given was one in which the Russian menace was immediate and alarming. If there is in fact a *détente* between East and West, and if the outcome of it is a settlement of the German question acceptable to all parties, the situation will have changed and the measures which were adopted to deal with a possible emergency of (it was feared) the near future will have to be replaced by others more appropriate to a long-term programme.

AN AMERICAN SUGGESTION

An American naval officer, Captain G. H. Miller, has had some shrewd observations to offer upon this important subject. The United States' commitments in Europe and the Far East will make it necessary for her to maintain, he points out, a position of reasonable strength over a period of many years—perhaps, indeed, for generations. It will not be the strength that was required when the country was keyed-up to the prospect of a possible war in the immediate future. The measure of the difference, he states, is that between a marathon race and a short sprint. In any case, a stockpile of weapons amassed for a possible war in the next year or two would probably be obsolete in, say, 1970. The long-term policy is thus a different problem from that which has been called for by the current situation. Now the United States, he suggests, is well placed to create a defence system that would provide reasonable security over an indefinite period and would be well within the ability of the American people to support. His suggestion is "a mobile, flexible type of military force" by means of which the United States could "concentrate power, whether it be in the form of ships, airplanes, infantrymen, atomic weapons or any other forces, at points on the fringes of the European and Asiatic continents."[2]

A firm believer in air power, while not suggesting that the naval and land services have not vitally important parts to play too, would prefer to give it a more prominent place in the picture than Captain Miller does, apparently, in a sketch of a future scheme of collective defence. He would do this with the greater confidence for a special reason to which Captain Miller does not refer. If and when the world settles down again to a state a little nearer normality than that which we have known since 1945, one of the first problems with which it will have to deal will be that of the replacement of a defence system designed to prevent a particular aggression from a notorious quarter by one aimed at preventing aggression in general. There will be no longer a potential "Enemy No. 1." The North Atlantic Pact was entered into to protect Western Europe from such an "enemy." The future situation, given the change for the better referred to above, will thus be rather that contemplated in the Charter of the United Nations than the situation in face of which the Pact was concluded.

AIR FORCES UNDER THE CHARTER

Now the Charter assigns a specially prominent place to air action as a means for the prevention of breaches of the peace. Article 42 provides that the Security Council "may take such action by air, sea or land forces as may be necessary to maintain or restore peace and security." Note the order: air forces come first. Nor is that all. Under Article 43 member-States of the United Nations undertake to make available to the Security Council such armed forces as are necessary for the purpose of maintaining peace, and Article 45 provides that the air components of such forces shall be held in a special state of readiness. It obliges the States to "hold immediately available air force contingents for combined international enforcement action." There is no corresponding provision in regard to sea and land forces. The air arm is clearly intended to be the court of first instance in any arbitrament of arms that may have to be resorted to by the United Nations Organization.

No arm is so mobile and flexible. It is the ideal instrument for immediate employment against disturbers of the peace at possibly unexpected times at possibly unexpected places. It would have to be followed up by the other arms if its intervention failed to prevent an outbreak: but, as is stated later, the deterrent effect should be sufficient in most cases to force the intending aggressor to stay his hand. The likelihood of prompt reaction to an outbreak would often be all that was needed to restore the situation, and for the taking of such action the air arm is pre-eminently qualified. It is the ideal trouble-shooter when trouble is in the wind.

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[2] Captain George H. Miller, U.S. Navy, in *U.S. Naval Institute Proceedings*, February, 1953, p. 154.

PERIPHERAL AIR BASES

Air action will be taken most effectively by formations which are specially earmarked for the purpose and are not too remote from the regions in which they may have to operate. Obviously they cannot be "on the spot" everywhere when the possible aggressor is the great unknown. The present set-up of the Allied Powers' air organization in Germany, with the 2nd Tactical Air Force (British, Dutch, Belgian) in the northern half of the Western Zone and the 4th (American, Canadian, French) in the southern, will not stand when the occupation comes to an end. Western Germany is in fact crammed with Allied airfields. "Flying over Western Germany," said the Aeronautical Correspondent of *The Times* in that paper on 19th May, 1953, "a traveller becomes accustomed to the sight of airfields seemingly every few miles." All this is part and parcel of a politico-strategical concept which will have been outdated, or at least will be tactfully assumed to be outdated, when conditions in Central Europe become more normal. Already, indeed, one finds in mid-April, 1953, an influential British journal saying that "the rugged posture of embattled defence which the West has adopted may have to be modified, if only because the still uncommitted nations of the world lay great store by correct attitudes."[3] What will happen to the other airfields that have been or were being established in Western Europe by the Atlantic Powers under their plan of defence—there would be forty-one in France, fourteen in Belgium, thirteen in the Netherlands and three in Luxemburg, in addition to the thirty in Western Germany, in 1953-54—cannot be foreseen, but it seems to be probable that they will have to be scaled down. A good deal of uneasiness is already felt in France about the location of American bases in that country. There are, however, a number of other air bases about the continuance of which similar difficulties should not arise.

They are the bases which the United States has established outside or on the western rim of Europe. They could not be regarded as having in view action against any particular aggressor; they are rather watch-towers looking out over Europe as a whole. They would be reasonably safe from danger of attack by long-range missiles. From them American bombers might take off if, for instance, a resurgent and rearmed Germany were to make a third desperate bid for *Lebensraum*. Who will say that that is utterly inconceivable in the years that lie ahead? Two of the bases in question, those near Casablanca, at Nouasseur and Boulhart in French Morocco, would have a special appropriateness for use for this purpose. It would be a fitting turn of destiny's wheel if they served to restore in Europe the balance of power which the decisions taken at the conference of Casablanca did more than anything that happened in the war to destroy. From the four north-west African bases and, if retained, the three which the United States are leasing in Spain, American air power could exercise a powerful influence upon the international position in Europe. The bases in question would be readily reinforced from across the Atlantic, and the cost of upkeep would not be great if they were left to care and maintenance parties until an emergency arose and they had to be taken into operational use.

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[3] *The Spectator*, 17th April, 1953, Editorial.

What of the bases which the United States has at present in Britain? Marshal of the Air Force Sir John Slessor has suggested that Germany's fear that she may again be a battleground in a war between East and West, and France's and Russia's fears of a revived and militarist Germany, could be overcome by "a guarantee backed by Anglo-American air power, based partly in the United Kingdom—a guarantee that an attack by any European Power against another would automatically bring down the weight of atomic air power upon the aggressor."[4] In a few years, no doubt, our British bomber fleets, re-equipped with Valiants, Vulcans and Victors, will be fully able to undertake any deep incursions into Europe from the north-west that may be needed, and, with refuelling in the air when necessary, could still undertake them even if their bases had to be moved back into Ulster as a precaution against attack by rockets or other guided missiles. Our bombers' incursions could be dovetailed into the forays of the American Air Force from the south-west.

THE UNITED STATES IN EUROPE

It would be a tragedy if all that has been done since 1949 to organize the Western defences were to be swept away in a violent revulsion of feeling that might succeed the somewhat hysterical apprehension of the past few years. At least part of the structure of peace that has been built should be preserved. Let the Americans, their ships and their aircraft continue to show the flag in this hemisphere, and the probability is that all will be well. American enthusiasts of the blue-sky school would deny that they require bases there. Sea power, says one of them, is dead or dying; it was "the last of the Mohicans," a noble breed that had its day. Overseas bases are "untenable" and quite needless. The United States can defend herself and the free nations of Europe by "direct hemispherical warfare," founded on global power.[5] Clearly the American Joint Chiefs of Staff do not share this view. The United States has established both naval and air bases in Europe and its vicinity, and she has at present armies there, too. She will eventually, no doubt, have no land forces over here except to guard her bases, but she can have in European waters a pretty tough substitute in the shape of her superb Marine Corps. And she will have her mighty bombers ready, as before, to drive home the blows which our own Bomber Command will strike. They will make the most adventurous of potential aggressors think twice. No one will know what they carry in their bomb-bays. They may never have to go into action. Their mere presence will be a warning and a shield. For what would the thunder of their onset mean? No one can tell. It might be only sound and fury, signifying little; but, again, it might be for a breaker of the peace the veritable crack of doom. (Korea was no guide to what will happen in a great war; the Korean War was a second-gear one.) Here is a climacteric mission for the United States to undertake. One cannot doubt that she will rise to the height of the occasion. She, more than any other nation, has the power to say: "There shall never be another great war." The First and Second World Wars would not have come if her intervention in them had been a certainty from the first. She can veto a world war because such a war is total and brings the whole war potential of the belligerents into action; and her war potential is stupendous. Her power is based ultimately on her unrivalled wealth and resources. It is the counterpart of her power in the economic field. If another great depression should threaten she could check it simply by raising her dollar price for gold. If the parallel catastrophe of a world war seemed to be approaching she could keep it at bay simply by making clear beyond possibility of doubt her intention to be in the fight, if it came, from the start. But she could play this master hand, this winning game, only if she held the right cards in the shape of the necessary armaments and, which is no less important, action stations at her disposal in or near the danger areas.

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[4] Article on "An Air Locarno" in the *Sunday Times*, 17th May, 1953.

[5] A. P. de Seversky, *Air Power : Key to Survival*, New York, pp. 3, 24, 38.

Fortunately these truths are now well understood in the United States. Both public and military opinion in that country accepts the conclusions that Western Europe is one of three critical regions (the others are the Middle East and the Far East) which it is in the interest of American security to help to safeguard from Communist domination. The United States is concerned not only because of the importance of denying to a potential enemy the great industrial resources of Western Europe, but also because "within it are located many of the most satisfactory bases whence to launch retaliatory attacks against military and industrial targets in Russia and the satellite countries."[6]

THE TRANSITION

It is in some such way as that outlined above that the transition from the forced-draught programme of defensive rearming of the recent years to the less-pressing policy of the long-term assurance of peace and security can be most smoothly and effectively accomplished. It will amount to a compromise which takes due account of the difference between the exigencies of a critical situation to which the North Atlantic Treaty was the appropriate and necessary response, and the more "normal" situation contemplated in the Charter of the United Nations. What is essential is that the most important practical result of these two instruments of peace and security should not be lost or materially impaired. In them the United States testified to her determination to take her stand with the nations everywhere who stand for peace, and to her intention to honour that undertaking by keeping forces in this hemisphere dedicated to the preservation of it. Her continued adherence to the line of policy thus traced would be affected, one can hardly doubt, by the extent to which the other peace-desiring States are prepared to share the burden. They must play their part, too. And in the meantime, it must be emphasized, there is no certainty that there will be a genuine *détente* or that it will last. Unless and until it is sure that there is one, and that it will not be a short-lived one, it is obviously essential to maintain our present policy of watchfulness and preparedness to meet an emergency which might be sudden and might be soon. And even the passing of that emergency will not bring the millennium to mankind.

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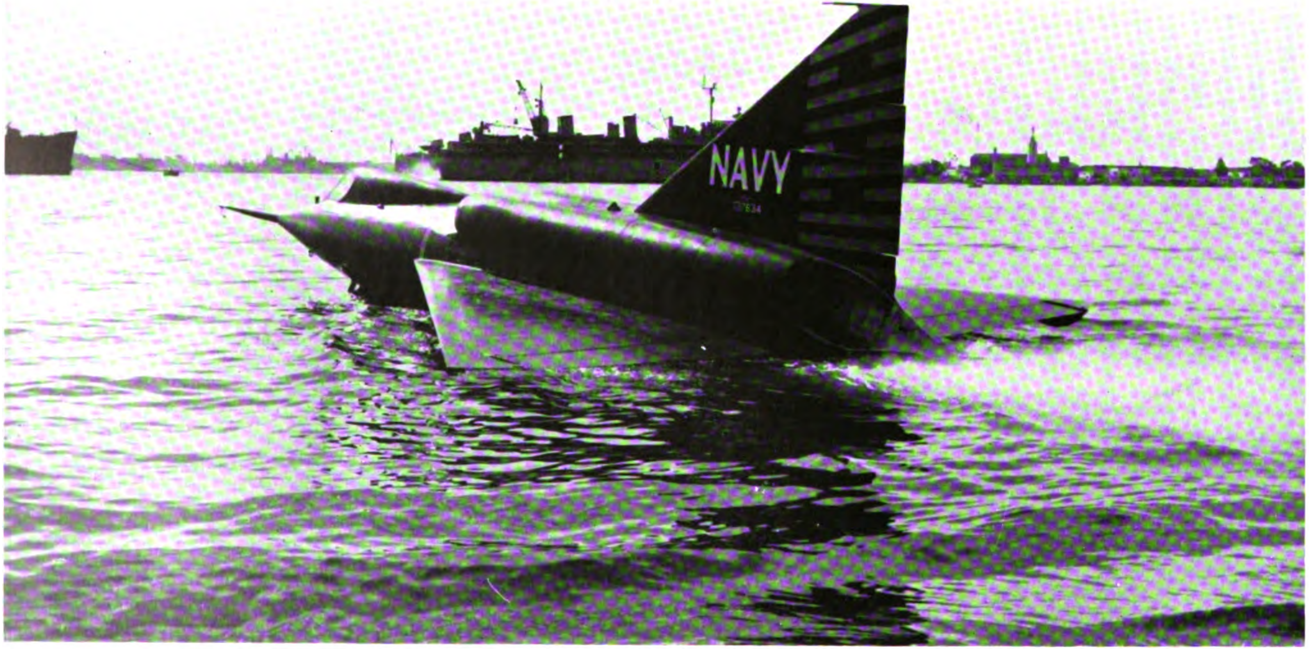
[6] *Britain and the United States: Problems in Co-operation.* A joint report by Study Groups of the Council on Foreign Relations, New York, and the Royal Institute of International Affairs, London, 1953, p. 106.



[Convair Photo

CONVAIR SEA DART, DELTA-WING FLYING-BOAT FIGHTER

A successful blending of the high-speed land aircraft's performance with the inherent versatility and mobility of water-based aircraft. Powered by two Westinghouse turbo-jet engines. Its performance is still secret. (See last page of article)

WHAT HAS KOREA TAUGHT US?

BY JOHN W. R. TAYLOR

NOW that the shooting is finished in Korea, military staffs all over the world will be busy studying the balance sheet of this unique campaign. They will find few material things on the credit side. After 1,128 days of battle the front line is nowhere far from the 38th Parallel, over which the armies of North Korea swarmed on 25th June, 1950, in hope of a quick victory against their ill-prepared southern kinsmen.

On the debit side it has cost 140,546 American and 4,451 British casualties alone to preserve South Korea's independence. In the process two and a half million Koreans have been made homeless and so much of their country has been devastated that President Eisenhower puts the initial cost of rehabilitation at £71,428,000.

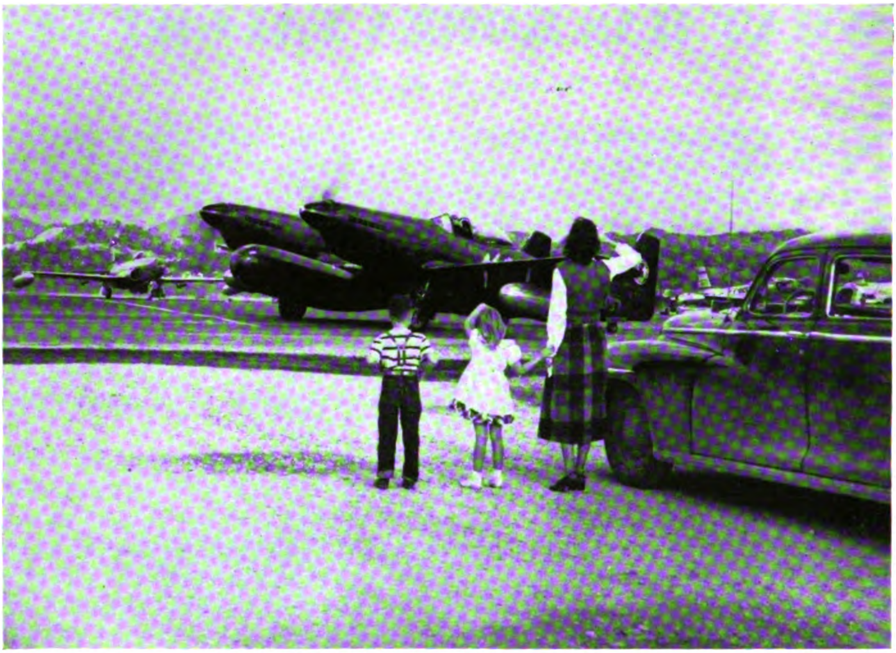
Because of United Nations and Chinese intervention on a large scale, Korea has been likened to the Spanish Civil War of 1936-9, which gave Germany, Italy and Russia an excuse to test in combat their latest military equipment and aircraft. Such comparisons are completely false, because at no time in Korea have either the Americans or Russians introduced their latest and most powerful weapons. In the air war the U.S.A.F. did not use even the early type of Sabre jet-fighter in quantity until the Communists began to build up their MiG-15 force on the Manchurian side of the Yalu, with the idea of scoring easy victories over United Nations piston-engined fighters and straight-wing jets.

Similarly, neither side used in action its available squadrons of fast jet tactical bombers or big strategic atom-bombers, with the exception of some photo-reconnaissance RB-45 Tornadoes. The Russians presumably did not consider that results would justify presenting U.S. Air Force intelligence teams with examples of the IL-28 and other bombers that might be shot down inside the United Nations lines. The U.S.A.F. did not need to use its jet-bombers because obsolescent, piston-engined B-29 Superfortresses wiped out almost every worth-while strategic target in North Korea in the first year of the war, after which Red supply bases were out of bounds in "neutral" territory north of the Yalu.

This Communist reluctance to send their MiGs and bombers into the battle area, where a damaged plane might be captured, enabled U.S. and British aircraft carriers to cruise continuously off the Korean coast throughout the war, launching their fighters and strike aircraft in support of the ground fighting, in comparative safety. Such operations would be suicidal in a total war, as would some of the operations carried out by helicopters in combat areas.

Korea was, therefore, in many respects a "phoney war," and it is absolutely essential to realize this before trying to learn anything useful from it. It was phoniest in the early days, when U.S.A.F. and R.A.A.F. fighter pilots operating from Japan—because airfields were not available in Korea—had breakfast with their wives and children, waved "cheerio" to them from the runway, took off, killed some North Koreans and returned home for lunch. It became less phoney when some pilots did not return; and soon many of the wives were sent home.

It was a phoney war too because the United Nations Air Forces always fought with one hand tied behind their backs. Their failure to stem the flood of North Korean invasion in 1950 and the later Chinese onslaught was regarded by some armchair critics as proof of the inability of air power to play a significant role in tactical warfare. The critics chose to forget that the enemy in Korea was usually an infantry man, moving without vehicles and artillery, at night, carrying only



[*Official Department of Defence Photo*

EARLY DAYS IN THE KOREAN WAR

Mrs. Gosnell, Bill (6) *and Sharon* (5) *watching Captain Johnnie Gosnell, of Borger, Texas, taking off from the airfield in South Japan on a mission over Korea in a twin-engined F-*82 *Mustang of the* 68*th All-Weather Fighter Interceptor Squadron, U.S.A.F.*

a rifle and a bowl of rice, over mountain trails where the front line was never held long enough to permit proper close air support—and, of course, supplied from bases that, for political reasons, could not be bombed. The critics need only cast their minds back nine years to the Falaise battle in Normandy for a true picture of the terrible destructive power of close support air warfare against a mechanized army in European terrain.

Nevertheless, despite its peculiar characteristics that would never obtain in total war, Korea can teach us many valuable lessons. If we ignore them we shall commit an error as tragic as our failure to exploit since 1945 captured German devices such as the R4M air-to-air rocket which was used with fantastic success in conjunction with the Ez42 gunsight by the *Luftwaffe's* crack squadron of Me.262 jet fighters.

FIGHTER "GADGETRY"

First and foremost, because in any future war the Western Allies are far more likely to be attacked than attackers, Korea should have killed the campaign for lighter, simpler first-line fighter aircraft. By this I do not mean there is no room for a ramp-launched, semi-automatic, semi-expendable, piloted target defence interceptor, with a rocket engine to drive it to 40,000 ft. in one minute and an endurance of five minutes. Nor, as I shall explain later, do I doubt the value of light-weight fighters for ground attack duties.

But for fighter-to-fighter combat or interception of fast high-flying or low-flying bombers, the modern fighter needs every gadget, every piece of radio and radar, every additional ounce of armament that it can carry without prejudicing performance and safety. No expense or effort can be spared to ensure the destruction of enemy raiders, any one of which might be carrying an atomic bomb. The result, inevitably, is a big, heavy, expensive aircraft with a big, heavy, expensive engine, needing a highly-skilled pilot and hydraulic power-boosters to help move the controls at high speeds.

These remarks will raise a scream of protest from proponents of aircraft like the Folland Gnat, which has the speed and climb of a Hunter on a fraction of the engine-power and at a third of the cost. But this is one argument for which Korea has offered an irrefutable answer. The MiG-15 is lighter, more heavily armed, faster climbing and, in some respects, more manœuvrable than the Sabre. Yet the Sabres have achieved a record of victories in combat better than ten to one in their favour because of more rugged construction, more complex but more efficient radar gun-sight, more protection for fuel tanks and pilot and better pilot training. The Communists have paid in blood for their freedom from expensive gadgetry and high structure weight.

BATTLING BANTAMS

Among the bravest pilots in Korea were, undoubtedly, the men who flew the "mosquitoes"—veteran Harvard training aircraft, used to locate and mark targets for close support fighter squadrons. They were essential in the early stages of the war, when Shooting Star jet-fighters, operating from Japan, had far too short an endurance to search for targets themselves. Later, when the jets were able to stay longer in combat areas, the "mosquitoes" were retained because their slow speed enabled them to identify targets far more efficiently than could pilots of fast jets.

The "mosquito" crews suffered many casualties, chiefly from enemy anti-aircraft fire, which was both heavy and accurate. If the enemy had thrown his fighter force into the combat they might have been driven from the air. On the other hand, unarmed Auster and Cub "spotter" planes have shown on scores of occasions that ability to turn on a sixpence, hedge-hop and land in any respectable-size field can often provide first-class defence against fighter attack. A specially-designed, easy-to-build, easy-to-fly "battling bantam" like the little Fletcher Defender (described in the January, 1953, ROYAL AIR FORCE QUARTERLY) could use these qualities not merely to spot targets, but to destroy them with napalm, bombs and rockets. There could be no better outlet for the design skill of the light fighter enthusiasts.

Even if the Defender type of aircraft is considered too vulnerable for a full-scale war, it would be ideal to meet aggression in places like Korea and Indo-China, and for "colonial" warfare tasks such as harassing the Mau Mau in Kenya. The French have shown, with their £50,000 680 m.p.h. Baroudeur, that a high performance jet ground attack fighter can be built simply at less than half the cost of a first-line interceptor. The Baroudeur has no undercarriage. It takes off on a rocket-propelled trolley and belly-lands on skis. Its designer claims that it can operate from any surface short of a ploughed field, and there seems little reason to doubt him.

BOMBERS

Korea taught one lesson concerning bombers. In the absence of effective air opposition, piston-engined Superfortresses were able to wipe out all worthwhile North Korean strategic targets effectively and speedily. When the MiGs appeared it was found expedient for the Superforts to disappear—all of which proves how wise is the Royal Air Force's policy of relying on high speed and extreme altitude rather than fire-power to protect its new jet atom-bombers.

[U.S. Army Photo

THE HELICOPTER EARNED IN KOREA ITS PERMANENT PLACE IN THE PATTERN OF AIR POWER

U.S. Marines of the Reconnaissance Company of the First Division climb aboard one of these assault transport aircraft, en route for urgent operations.

[United States Information Service

HELICOPTER TAKING WOUNDED FOR SPEEDY SURGICAL CARE

There is a wounded soldier in each compartment. The evacuation of some 25,000 wounded (many of whom would not have survived an overland journey) by conveying them smoothly and swiftly for urgent surgical attention, saved innumerable lives in the Korean war.

HELICOPTERS

At the other extreme in speed, operational ceiling and streamlining, the helicopter has earned in Korea its permanent place in the pattern of air power. The U.S. Marines were able to test under combat conditions their theories on the value of helicopters as assault transport. Whole companies of fully equipped Marines were flown in ten-seat Sikorsky, HRS-1 (S.55) helicopters to almost inaccessible mountain-side positions in the front line. Days of marching were avoided. Troops arrived in the line fresh. On occasion telephone lines to H.Q. were laid from the helicopters as they delivered the soldiers.

To critics of the 'copter's seeming vulnerability, the Marines will cite examples of missions completed with rotor blades holed by anti-aircraft fire. And can there be any doubt that the 90 m.p.h. helicopter, moving in three dimensions, is less of a sitting target than assault landing craft or lorries moving comparatively slowly in two dimensions? The U.S. Marines and Army are convinced sufficiently to plan the use of helicopters almost exclusively for short-range transport in combat areas. But it is unlikely that helicopters will ever again be able to operate without air cover, as in Korea, and strong forces of escort fighters will be essential.

Similarly, evacuation by helicopter of some 25,000 wounded—many of whom would never have survived an overland journey—has saved so many lives in Korea that one can only wonder at the apparent lack of enthusiasm for helicopters in this country. Despite their prehistoric appearance, vibration, expense and complication, helicopters are here, right now, and the sooner we start building them the better, for British helicopter designs are the best in the world.

FLYING-BOATS

Equally tragic, especially after the lessons of Korea, is our continued lack of interest in flying-boats. The war in Korea was very nearly over in July, 1950, before the United Nations were able to organize effective aid for the demoralized South Koreans. With the few usable airfields in enemy hands, our fighters and bombers had to operate from Japan. The only immediate help the Royal Air Force could offer was a squadron of old but superb Sunderland flying-boats, which needed no acres of concrete from which to operate. In fact, Sunderlands remained the only R.A.F. operational aircraft to see service in the Korean War, except for Auster "spotter" planes, flown mainly by Army pilots.

The Navy helped to save a delicate situation in the early days and provided air support throughout the war by bringing its floating airfields within a few miles of the Korean coast and flying unprecedented numbers of sorties in close support of the United Nations armies. But if the enemy had decided to throw submarines and bombers into the battle, the carriers would have had to pull out—for until ship-to-air guided weapons or ramp-launched interceptors have been perfected, carriers are still highly vulnerable to air attack. Their main task in total war would be to hunt out and destroy the submarines threatening our seaborne supply life-lines, and for this task, in mid-ocean, they still have no equal.

Fortunately, in Korea, it was possible to supply also land-based air support from Japan. But how much better it would have been if squadrons of water-based fighters, bombers and transports had been available to provide on-the-spot air cover and reinforcements.

In this respect the fantastic little Convair Sea Dart delta-wing flying-boat fighter is one of the most interesting aircraft ever built. Its unique hydro-ski undercarriage enables it to operate from rougher water than usual for a small flying-boat. Its powerful twin jet engines offer supersonic speed and help to thrust it quickly off the water. Backed up by a fleet of flying-boat tankers and transport aircraft, a force of Sea Darts would offer an entirely new concept of mobility in striking power—able to operate almost anywhere in the world at a moment's notice, instead of being shackled to acres of concrete runway.

The U.S. Navy's Fleet Logistics Air Wing proved the value of transport flying-boats with its big 70-ton Mars aircraft. In October, 1950, at the most vital stage of the war, *Hawaiian Mars* alone flew an average of more than 12 hours a day every day of the month, carrying up to 133 troops at a time across the Pacific *en route* to Korea.

Is it not time, therefore, that we in Britain began to show some interest in the superb designs for flying-boat fighters, patrol bombers and transports on the drawing-board at Saunders-Roe and Shorts, before we lose our traditional leadership in marine aircraft? The U.S. Navy has never stopped ordering new flying-boats, and there is no doubt of their value in a total war, when airfields would be priority targets for enemy raiders.

CONCLUSION

These, then, are the lessons on air strategy and air force equipment taught by this unique war. There is one far more important lesson, which has given some purpose to a bitter and otherwise profitless campaign. For the first time a league of nations, organized for peace, has met force with superior force and preserved the freedom of a small country. The United Nations did not fail South Korea politically or militarily, and their support did not, as many feared, result in a third world war. In that fact lies hope for the future—a hope that must be backed up by such overwhelming air power that no nation, great or small, will ever again dare to attack its neighbour. For air power is the key to survival in an atomic age.

"AIR POWER," JANUARY, 1954, NUMBER

Articles and illustrations for the next issue of this Journal, which will be published in January, 1954, should be sent to the Editor not later than 1st November, 1953.

GUIDED WEAPONS AND AIR POWER

BY SQUADRON LEADER R. I. GRAY, A.M.I.E.E., A.M.BRIT.I.R.E., R.A.F.

BECAUSE of the increasing difficulties of high-altitude, high-speed interception, the decreasing margin of performance between the all-weather fighter and the bomber, and the limitation of warning imposed by the radar horizon, fighter defences using conventional armament are rapidly becoming ineffective. Against attacks by jet-bombers carrying atomic bombs the attrition rate would be unacceptably low. The increased performance and lethality of guided missiles will do much to restore the balance.

To avoid the guided-weapon defences and to achieve the necessary high degree of accuracy, bombers will be compelled to use guided bombs or missiles, releasing them at safe distances from the target. At the same time, long-range, surface-operated G.W. systems will supplement, and might ultimately supersede, the bomber forces. Anti-G.W. defences and subsequent offensive weapons are subjects for conjecture.

Meanwhile, the armies and navies will be developing their own G.W. to replace guns and, to some extent, tactical air power. To the army commander the use of G.W. instead of close air support would be very attractive for two reasons. Firstly, his strategy would not be predetermined so much by the battle for airfields. Secondly, the new fire power could be controlled directly by the forward formations. The longer-range missiles could be launched from base areas and transferred to terminal guidance near the front line. This would alleviate the bomb-line problem; at least the soldiers could blame no one else for inaccuracies. From the naval point of view, probably the greatest attraction would be the reduced need for aircraft carriers.

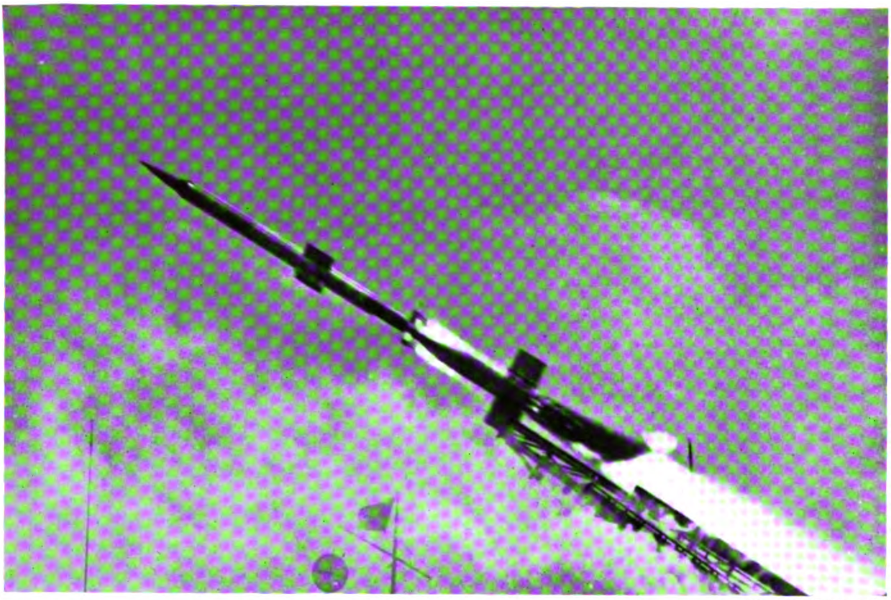
The technical problems still to be solved are at least generally appreciated by the designers. On the other hand there are many operational questions that have not yet been given sufficient thought. There is no time to waste; some G.W. will come into operation within the next few years.

This revolutionary form of fire power calls for a critical approach to the general problem of warfare. The armed forces have developed in their traditional elements and naturally tend to look at G.W. from different points of view. This can be an advantage provided that in the competitive struggle for control there is no misdirection and waste of national effort.

Above all, the organization of the armed services must be as progressive in conception as the new weapons. Let us examine the effects that the use of G.W. might have on the structure of the Services, particularly of the air forces.

GUIDED WEAPONS

The applications of guidance and control cover a comprehensive range of weapons. For the lower performance weapons it has been a comparatively simple step to install the necessary electronic equipment and instruments in the place of aircrew, in what would otherwise be conventional aircraft, to produce drone targets or experimental vehicles. This is a direct development of the techniques used, even before the last war, for radio-controlled targets. The addition of a warhead or bombs completes the simple guided missile, a type already used by the U.S. Navy in Korea.



[Crown Copyright

LAUNCHING THE GUIDED MISSILE

At the other end of the range there is an entirely new breed of rocket-propelled missiles designed specifically for the purpose. These can travel considerably faster than the speed of sound, can be far more manœuvrable than manned aircraft and have a high lethality. Being independent of atmospheric oxygen for fuel their ceiling is far higher than that of jet aircraft. Nor are they necessarily dependent on the atmosphere for aerodynamic control. A pure rocket missile, such as the German V2, can control its flight by deflecting the burning gases at the outlet of the motor.

Control is the automatic process by which electro-mechanical servo systems inside the missile stabilize its flight and produce the lateral accelerations necessary to make the missile respond to guidance information.

The techniques of guidance are equally comprehensive but, by necessity, are normally based on electro-magnetic and gravitational principles. In the simplest form of guidance, flight instructions are passed to the missile over a radio link. The more elaborate missiles have self-contained intelligence systems designed either to "home" on to a specific type of target or to navigate by referring to natural or man-made external data in accordance with stored information. Any one G.W. system may employ different methods during the initial, mid-course, and terminal guidance phases.

Between these extremes, all the changes can be rung to provide the individual performances and applications required by the armies, navies and air forces. A G.W. system, comprising the missile, launcher, and guidance equipment, will fall into one of the following categories:

AIR WEAPONS

Air-to-air (A.A.G.W.): Fighter offensive and bomber defensive armament.

Air-to-surface (A.S.G.W.): Guided bombs, anti-ship and other surface target weapons.

SURFACE WEAPONS

Surface-to-air (S.A.G.W.): Anti-aircraft weapons for land and ship defences.

Surface-to-surface (S.S.G.W.): Long-range bombardment and short-range tactical weapons.

The possibility of recoverable or expendable guided vehicles for reconnaissance, or other purposes must not be ruled out. The expendable type would probably be self-destructive for security reasons.

STRATEGY AND TACTICS

The Services for whom these weapons are being designed have developed against a traditional background based upon the "field of battle" concept.

Before the advent of air power there had been little likelihood of weapons ever again having sufficient range to strike at the heart of the community, as they did in primitive, tribal warfare, except indirectly by blockade. Collective security had provided defence in depth by restricting warfare to the fringes of the community and to pitched battles. Modern total war is a development of method but a reversion to primitive principles, and air power has turned the wheel full circle.

If we now find it difficult to reconcile the concept of total war with the imaginary and hence indefinable line of demarcation between tactical and strategic targets, we must blame our forefathers. Certainly we do not mean that armies, navies, and air forces committed to battle, the only outward expression of a nation's ability to wage war, are of any less strategic value to the nation than the rest of the war machine that supports them. In practice the operational area of surface forces is defined by the striking range of their weapons, which is now determined by the range of army and naval air forces, within the practical limits of control and communications.

G.W. will enable surface forces not only to enlarge their operational areas whilst reducing their dependence upon "tactical" air forces, but also to compete with "strategic" air forces.

AIR POWER

In spite of their comprehensive technical and administrative backing, air forces are essentially flying organizations and all supporting services are rightly subordinated to the primary task of air operations. The use of air G.W. will increase the striking power of air forces at the cost of an increase in technical backing, but apart from a general integration of staffs, will pose no major problems of organization. On the other hand, the introduction of surface G.W. will tend to be controversial. For example, to an airman it might seem obvious that the missiles are aircraft or aeroplanes, and in any case inherently a new form of air power to be wielded by air forces. Similar arguments could be put forward by the soldiers and sailors to prove that guided missiles are shells or rockets and are merely a new form of fire power. The point is worth analysing.

Because it can develop forces to modify its trajectory appreciably from the parabolic form described by a simple missile, a guided missile is, by definition, an aircraft ("air" in this context meaning space, whatever the atmospheric content). If it derives these forces from its motion through the atmosphere a guided missile may also be defined as an aeroplane. However, all missiles are subject to aerodynamic forces; their motion is seldom simple enough to ignore the complex forces arising from pressure differences (e.g., the Magnus force caused by rotation). The difference between missiles and aircraft cannot be defined mathematically because there is no point of transition, merely a change in point of view. Because aerodynamic control is always the resultant of complex thrust, lift, and drag forces, the transition from aircraft to aeroplane is also quite arbitrary.

Whilst it may be natural for an airman to describe some forms of guided missiles as unmanned aircraft because they look like conventional aircraft and fly on an even keel, it is as misleading as considering the more advanced breed as shells or conventional rockets. The guidance system gives this new form of fire power its characteristics; it is much less confusing to use the right terminology.

The ability of missile weapons to damage targets is a measurement of striking power. Because most missiles travel through the "air" all this striking power could, conceivably, be called air power, from whatever medium the missile might be launched. But, the only sensible meaning of air power is "the manifestation of the effectiveness of air forces." This, and the equivalent definitions of sea and land power, might appear to be truisms, but other interpretations are frequently used.

Except special applications such as bombs, torpedoes and mines, missile weapons themselves cannot exhibit inherent land, sea or air characteristics; it all depends upon which form of manned transport carries the launcher and also, for G.W., the guidance equipment. Therefore, of the whole range of G.W., those requiring the direct use of manned aircraft for launching or guidance are air weapons, and all the rest are army or naval weapons.

Clearly, however, the problems of organization and control in both offence and defence will be accentuated by the use of surface G.W.

REORGANIZATION

It will become impossible to operate manned fighter aircraft, S.A.G.W. and A.A. guns in the same defence zone unless one organization is in sole operational control of all weapons—even then it will be difficult. The problem would be simplified if G.W. could quickly supersede fighters, but, because of the need to prove the reliability of the new weapons and also because of their high cost, mixed defences are likely to continue so long as fighter interception is possible.

Similarly, it will be essential for the operational control of medium and heavy bombers and long-range S.S.G.W. to be vested in one authority who can also study the operational implications of both systems and direct development accordingly.

It could be argued that because the operation of manned aircraft is more difficult than the operation of G.W., because existing control and reporting systems are normally air force responsibilities, and because the air forces provide air intelligence and reconnaissance, both S.A.G.W. and long-range S.S.G.W. should be operated by the air forces. Opinion on this subject varies not only between Services, which is understandable, but also between nations.

Integration is essential. Whether the resultant hybrid forces should be called air forces, artillery, or something new depends on the proportion of manned aircraft to G.W., and this will progressively decrease.

Whatever colour of uniform is chosen for G.W. personnel, there is little doubt that forces will ultimately be organized on a functional basis, as opposed to the three traditional elements, into the following main operational groups:

(*a*) *Base Defence*

- (i) *Air*. Fighters with A.A.G.W. or conventional armament, S.A.G.W., A.A. guns, control and reporting systems, air/sea and land rescue.

(ii) *Surface.* Army, coastal guns and naval forces, maritime air forces with G.W., bomb disposal and civil defence.

(*b*) *Combat Forces.* Existing army, navy and air force formations separately or together, using all types of G.W. except long-range S.S.G.W.

(*c*) *Long-Range Bombardment.* Medium and heavy bombers using conventional or guided bombs and other A.S.G.W. Long-range S.S.G.W., Recce. and Met.

The conception of integrated fighting services is not new. How long tradition and prejudice will continue to outweigh operational and economic factors is anyone's guess. Certainly, all the compromise solutions will be tried first.

PERSONNEL

The personnel required for the preparation of missiles and the maintenance of G.W. systems generally must be technical and with a strong bias towards electronics. Also, because the guidance and control components of the missile are connected in closed servo loops, and because the complete system is a closely-knit entity, key personnel at all levels must have a sound general knowledge of the complete weapon system so as to be competent to assess serviceability and to diagnose faults during functional testing.

In the use of surface G.W. it is because most of the processes of missile preparation and monitoring up to the moment of launching consist of technical appreciations, that the operational and technical aspects cannot be divorced, as they can with manned aircraft. The type of officer required for the operation of S.A.G.W. and S.S.G.W. is an artillery officer with the necessary G.W. training. There is no direct equivalent in the air forces at the moment although there is plenty of useful material. The ability to fly a conventional aeroplane is not, of course, a necessary qualification for this task.

Again, some form of integration seems to be the answer and as a stop-gap selected personnel from any Service could be trained for the job.

FUTURE TRENDS

The introduction of guided weapons generally will increase the proportion of technically trained personnel in the armed Services at all levels and will accentuate the existing manpower problems, particularly in the field of electronics.

Surface G.W. will enable armies to compete with air forces in air defence and long-range bombardment on increasingly favourable terms. The necessity, not only for unified control where the operations overlap, but also for strict economy in national effort, will ultimately compel the Services to integrate partly or completely.

S.A.G.W. field defences will normally be army responsibilities, but the policy for static base and home defences will differ from one country to another. On the other hand, most soldiers will probably find it hard enough initially to get the necessary men and money to meet their primary commitments and will be only too pleased to leave long-range S.S.G.W. bombardment to the air forces.

Air forces that use surface G.W. will, by necessity, become hybrid organizations with combined air and ground operational staffs. The elder hybrids—the armies and navies with their own or associated air forces—may welcome this move as a first step towards ultimate integration, if only because it will ensure a nice balance in future arguments about the entity of air power.

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The Wing Commander (Flying) briefing his crew before the Polar flights described in this article. (See page 29).

THE ROYAL AIR FORCE FLYING COLLEGE, MANBY

BY SQUADRON LEADER F. A. COLEMAN, B.A., R.A.F.

INTRODUCTION

THE Royal Air Force Flying College at Manby is still a young and developing institution; it was formed as recently as July, 1949. It is perhaps appropriate to include in the first number of AIR POWER an account of this youngest of our Service colleges, since the use of air power is intensely studied there, both practically in the air and theoretically, by a group of students drawn from the Royal Navy, the Royal Air Force, the Commonwealth Air Forces and the U.S.A.F. The College motto is the one word "Progress"—surely an appropriate injunction where air warfare is concerned.

The name itself, "Flying College," though undoubtedly selected after much thought, has nevertheless given rise to misconceptions about the activities at Manby. Since there is a slightly senior and more dignified ring about the word "college" than about the word "school," so to many it has seemed that the Royal Air Force Flying College must simply be a rather senior and more dignified (and hence more sedate?) flying school. There is, however, rather more to it than this.

The Commandant of the Royal Air Force Flying College has a number of interesting units under his command. Apart from the tutorial staff and students of the Flying College Course, and the Specialist Navigation Course which moved to Manby from Shawbury last year, there are the squadrons which supply the flying effort for both courses. No. 1 (Heavy) Squadron is at Manby with Hastings, Lincoln and Valetta aircraft. No. 2 Squadron is at the satellite, Strubby, and handles the Canberras, Meteors and Vampires. At Manby, too, are No. 3 Squadron—the Handling Squadron—which produces the "Pilots' Notes" for all new types of aircraft, and No. 4 (Research and Development) Squadron. In addition, the College is responsible for periodically running short courses in guided weapons for General Duties officers.

This article sets out to give an account of the various activities at Manby, and in addition the Flying College proper and its *raison d'être*.

THE ROYAL AIR FORCE FLYING COLLEGE COURSE

The fighting efficiency of the Royal Air Force depends largely upon the extent to which its commanders and staff officers understand the capabilities of the air weapon in all its forms. However, the complexity of modern air warfare, and the rate of scientific progress, make it difficult for officers of the General Duties Branch, in the normal course of their duties, to keep abreast of developments in all the various types of air operations. It is the function of the Royal Air Force Flying College to fill this gap, and the aim of the Flying College Course may simply and briefly be said to be "to expand the operational outlook of selected General Duties officers."

The first Flying College Course assembled at Manby in January, 1950, and at the present time No. 4 (1953) Course is immersed in the operational studies

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A student taking off on a Weapons Exercise at Strubby, where the jet squadron operates.

TEDDER BLOCK

The fine Instructional Block at Manby, inherited from the Empire Air Armament School.

phase of the course. There are thirty-two students on each course, chosen from suitably qualified pilots and navigators of the ranks of group captain, wing commander and squadron leader. They are required to be in flying practice, and the pilots are required to hold a current instrument rating. The course is of just under one year's duration, and students who complete it to the satisfaction of the Commandant are awarded the symbol "p.f.c."

The course includes some 200 hours' flying for each student, not only to give practical experience in the handling of representative modern aircraft, but also to give experience of air tactics as employed in all operational roles, in the use of weapons and in navigation techniques. Close attention is given to the factors involved in all-weather flying. The syllabus also embraces a study of the operational potential of present and future aircraft, weapons and equipment (including guided weapons), and the students are given an appreciation of some of the scientific methods which may be applied to the conduct of air warfare.

Overseas training flights are made to give practice in bombing and navigation techniques, including the special navigation techniques used in high latitudes. A number of overseas liaison flights are also made to enable students to discuss problems of mutual interest with Commonwealth and Allied Air Forces.

The concept as a whole is that the syllabus should be based less on what has happened in the past than on what is likely to happen in the future, so that the future air commander may keep abreast of every development and trend in the tactical and technological fields.

In order to carry out the comprehensive programme of flying and ground studies the course is divided into four syndicates, each under the guidance of a syndicate leader. The syndicate leaders direct the students throughout the course and ensure that they get the best value out of it. They and their deputies not only act as flying instructors, but also supervise directly much of the ground training, including training on synthetic equipment and lectures or demonstrations to support the flying and to supplement the instruction given by the specialist instructors. The specialist instructors cover a wide variety of basic subjects in the science of military aviation, and the College has good facilities for instruction and for practical demonstrations. There is also an excellent College library well stocked with scientific, technical and "background-reading" books.

However, the heart of the ground instruction is centred in the Operational Studies Section. The task of the Operational Studies Section is to provide the necessary material for students to be able to make a comprehensive study of the present and future operational capabilities of the Royal Air Force. It has been found that a valuable method of presenting this information in the Operational Studies Section is by wall charts and large-scale displays; but this method is also supplemented by detailed notes covering all the operational Commands, by lectures, and by exercises on the planning of air operations which are presented to the students for solution.

It may be interesting to take a brief look at the course from a student's point of view. On arrival he is at once allocated to his syndicate, and after acquiring a good deal of flying and other equipment, having his photograph taken and attending the customary opening service in the fifteenth-century station church, he is plunged without further ado into the revision/conversion phase of the course. In this phase he is converted to the types of aircraft he will have to fly, bearing in mind his previous flying experience. At the same time he is rapidly "refreshed" in basic academic and technical subjects.

After a short spell of leave in which to recuperate, he is then ready to embark in earnest upon the operational studies dealing with the various Operational Commands of the Royal Air Force. He will find himself in a new syndicate, which gives him a chance to hear some more points of view and to get involved in new arguments. In each operational study the College staff first outlines the problem, and then the subject is pursued to its limit in a series of lectures by recognized experts in each field of study, and by visits to the appropriate aircraft and engine firms and research and development establishments. To consolidate all this work the student is presented with a number of searching and realistic operational exercises for solution.

All the time the exercises in the air are arranged to fit in with the ground studies, so that theory is tempered by realism. Our student, for example, remembering what a hash he made of that quarter attack at 35,000 ft. the day before, is less likely to write a wildly optimistic solution to his exercise in air defence than he would be without that salutary experience.

To round off the course he will find himself engaged in a liaison flight of three to four weeks, visiting perhaps U.S.A.F. bases, doing survival courses in Canada or checking up on the war in Korea. After this pleasant and always profitable excursion he must help to write a report and present his findings to the rest of the course. These overseas flights are certainly the most spectacular feature of the work of the College, and it may be of interest to quote a few examples of interesting flights which have been made.

One of the flights on the first course (1950) was a round-the-world flight in the Lincoln Aries. During the first stage from London Airport to Khartoum a new world record was set up, and Perth in Australia was reached in only sixty-two hours elapsed time from Manby. The stage from Mauritius to Perth, a distance of 3,220 nautical miles, was the first west-to-east crossing of the Indian Ocean by a land plane.

No. 2 (1951) Course also completed a fine series of flights, the most interesting of which from the flying point of view was a non-stop flight by Aries from Keflavik in Iceland to Fairbanks, Alaska, via the North Geographic Pole. The return journey over a different route, which took the aircraft near the North Magnetic Pole, was even longer, a distance of 3,590 nautical miles from Fairbanks direct to Manby.

An interesting flight of a rather different kind at the end of No. 3 (1952) Course was a tour of the N.A.T.O. countries in Europe, including Norway, Denmark, Germany, France, Italy, Greece and Turkey. Twenty-five moves were made in twenty-six days, and the visiting team was given an excellent opportunity to learn more about N.A.T.O. and to judge at first hand the effectiveness of Western air defences. This tour was, of course, more interesting from the liaison than from the flying point of view, although the flying schedule was strictly adhered to in spite of the vagaries of the weather encountered in Europe in winter.

During the luncheon interval at the Royal Air Force Review at Odiham in July there were a number of "General Interest" events. One of these was the return of a Flying College Hastings from what was in fact a routine training flight for the navigators, but was nevertheless a fairly remarkable flight. Within a five-day period the Hastings had been flown from Manby to Thule, the American base in North Greenland, had completed two sorties from there to the North Geographic Pole, and returned direct from Thule to arrive over Odiham at the precise time laid down. Allowing for the fact that one day's flying had to be abandoned because of fog and snow at Thule, this is a tight schedule.

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The Hastings which flew over the R.A.F. Review at Odiham, setting off for the North Pole.

"*When we ditch, gentlemen, this is how we'll do it!*" ***Pre-flight briefing before a Polar flight.***

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One of the most important liaison flights made each year is the one to visit the United States Air Force. These missions are of the greatest value to the Flying College, for they not only bring back news of some of the latest technical developments, but the students have a most valuable opportunity to compare notes with officers of the United States Air Force.

On many overseas flights the Flying College is asked to test and to report on items of equipment before their introduction into the Service, or on the functioning of existing equipment in unusual circumstances. Compass tests, for example, have been carried out in regions of low horizontal magnetic-field strength, and several new types of flying clothing and survival equipment have also been tested.

It can be seen from this outline of the activities of the Flying College that the course covers a wide field, from the practical flying and operation of aircraft to the planning of all types of air operations. It is strong meat, but not unworthy for our future air commanders to exercise their teeth upon.

THE SPECIALIST NAVIGATION COURSE

In August, 1952, the Specialist Navigation Courses, which had previously been held at the Central Navigation and Control School at Shawbury, were transferred to Manby, and they are now an integral part of the Royal Air Force Flying College.

The "Spec. N." Course has been in existence for over thirty years. The first course started at Calshot, then the School of Aerial Navigation and Naval Co-operation, in 1920. Its aim is to produce graduates who have a sound academic background, are familiar with all staff aspects of navigation, and are aware of the directions in which navigation research and development are proceeding. To achieve this, entrance is limited to flight lieutenants and squadron leaders, who have to pass a qualifying examination and are already experienced practical navigators. The syllabus is designed to give them an appreciation of the principles and practices of navigation in its broadest sense throughout the Service. This, coupled with instruction in mathematics and physics, puts graduates in a position to advise on, initiate or assist in research and development work on navigation aids and equipment.

The course is divided into academic, Command and research phases. During the academic phase the majority of the lectures on such subjects as air navigation, astro meteorology, etc., as well as mathematics and physics, are given. In the Command phase the students study the navigational techniques and problems of each R.A.F. Command, both on the ground and in the air. The research phase is devoted to a study of the navigation equipment under development, and visits are made to units engaged in this work and to factories producing the equipment. It is during this phase that a training flight is made to the North Geographic Pole and to the R.C.A.F. Central Navigation School, where a sister course is run by the R.C.A.F. and where an exchange of information and views takes place.

The output of the Specialist Navigation Course, which runs for forty-one weeks, is twelve students per year, and successful completion carries with it the symbol "N." Since the war, officers from all the Commonwealth Air Forces have attended the course, and at present two places are allotted to the R.A.A.F. and one to the U.S.A.F., an arrangement which is of mutual benefit to the students and the staff.

It is, of course, advantageous for two of the most advanced courses for

General Duties officers to live and work together in the same College. In particular, the "Spec. N." Course has access to the Operational Studies Section for its Command studies, and it can also call upon the wide variety of specialist lecturers who were primarily established for the Flying College Course. Similarly, the Flying College Course cannot fail to profit by having so close at hand the fountain-head of navigational skill, knowledge and doctrine.

THE GUIDED WEAPONS COURSE FOR G.D. OFFICERS

There is yet a third course for General Duties officers at the Flying College known as the Guided Weapons Course. This course was first introduced in June, 1952, because it was felt that the development of guided weapons had progressed sufficiently to warrant the briefing of certain General Duties officers on the basic principles of these weapons, and in their employment in air operations.

Each Guided Weapons Course is of one week's duration, and the courses are held at intervals of approximately three months. The officers attending these courses are normally of the rank of squadron leader or above, and they are nominated by Command Headquarters and Air Ministry Directorates according to an agreed allocation of vacancies. Some of the lectures to the Guided Weapons Course are given by visiting lecturers, but the greater part of the instruction is now entrusted to officers of the Flying College staff.

THE HANDLING AND RESEARCH SQUADRONS

No. 3 Squadron (the Handling Squadron) and No. 4 Squadron (the Research and Development Squadron) are also part of the Flying College establishment.

The task of the Handling Squadron is to provide material for the preparation and periodic revision of "Pilots' Notes," not only for the Royal Air Force but also for Naval Aviation. The Handling Squadron therefore includes a number of Naval Aviation personnel. Theirs is an interesting and most important task, but it is already well known to the Service and there is no need to dwell on it here.

The Research and Development Squadron investigates and evaluates problems and techniques related to flying and flying equipment. The work of the Squadron has included the testing of approach and landing procedures and the evaluation of navigation systems for high-speed flight. It is interesting to note that the Research and Development Squadron has for some time been ably commanded by exchange officers of the United States Air Force.

Both Squadrons make good use of the considerable store of knowledge and experience to be found among the staff and students of the Flying College Course, and it is fortunate that these Squadrons and the Flying College Courses are able to be so closely associated.

CONCLUSION

The Royal Air Force Flying College was an imaginative conception—a blend of the three Empire Schools: E.F.S., E.A.N.S. and E.A.A.S. Each generation of students brings with it new ideas and new outlooks, which eventually find expression in the discussions and the solutions to the operational problems the students have to solve. It is only by this flow of new ideas, and by keeping in close touch with the Operational Commands, that the College can live up to its motto, "Progress." It is much to be hoped that Commands will continue to keep the College primed with their latest ideas and ensure that it remains a live, practical and progressive institution.

MARITIME AIR POWER

BY REAR-ADMIRAL H. E. HORAN, C.B., D.S.C., R.N.

THE Coronation Naval Review at Spithead made anyone who had spent the standing part of fifty years in the Navy think how times had changed as far as warfare at sea was concerned. Gone were the serried lines of battleships and battle cruisers, and in their place were a vast array of frigates, destroyers, minesweepers, submarines and (most important of all) aircraft carriers. On top of this was an almost complete innovation—a fly past of over 300 aircraft manned by naval officers and ratings.

To one who had been brought up in the naval tradition, this all seemed very new and at once set up a train of thought as to why this startling change had taken place. After careful consideration the following facts emerged and proved, at any rate to the writer's satisfaction, that this advance was not only logical but inherent in the way that both strategy and tactics are changing at sea.

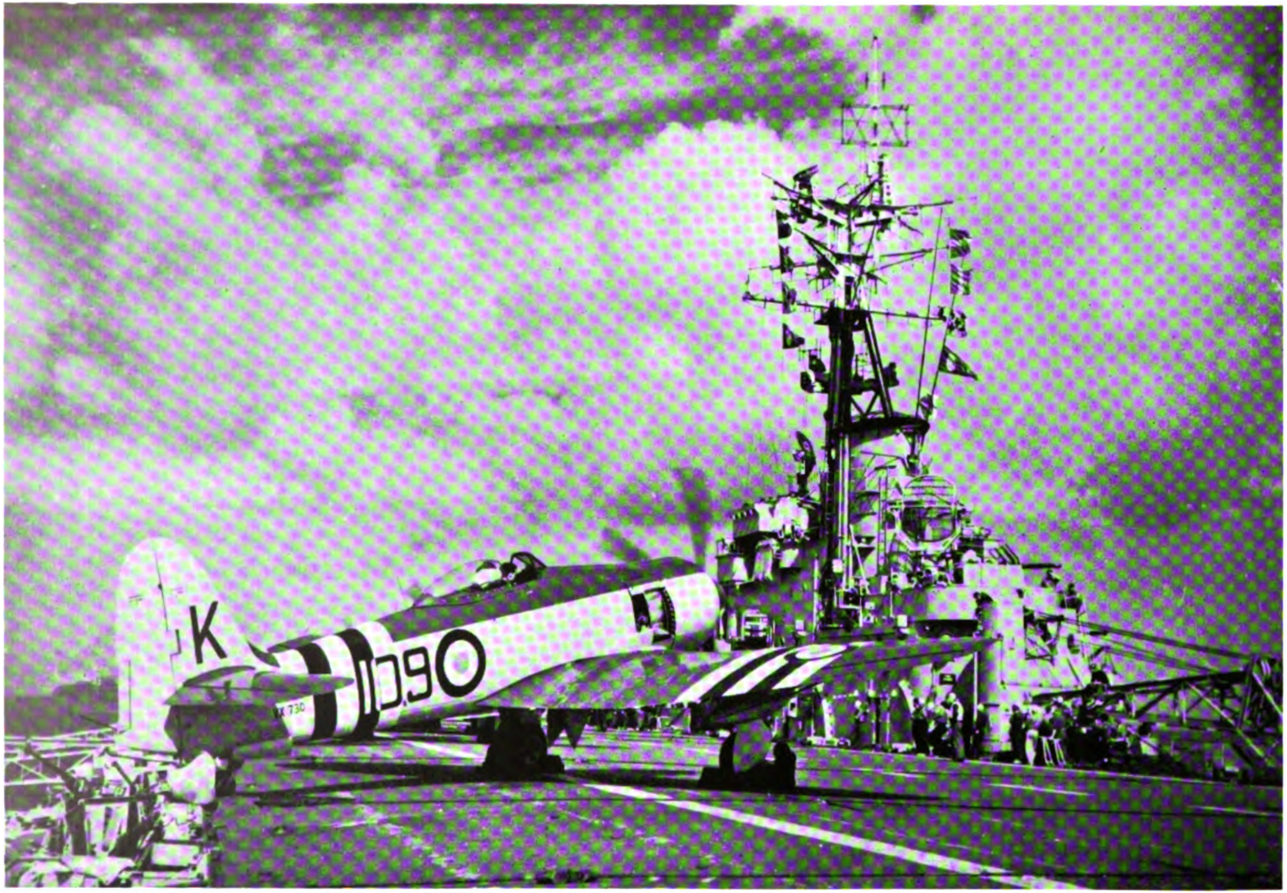
First and foremost we must look at what the role of the naval forces is in war. The Navy is one of the three armed services whose duty, in the event of war, is to break the will of the enemy to resist. The Navy cannot do this off its own bat and has never had any pretensions that it could. Throughout the ages the Navy's object has been to control the sea communications, first of these islands and latterly of the Commonwealth and Empire. The normal way of doing this was to destroy any enemy forces which disputed this control whenever and wherever they were met with.

In the old days surface ships were all that were employed, but in the First World War a new weapon—the submarine—made its appearance and, by its power to make itself invisible, made the task of the surface forces more difficult. However, this was overcome by the reintroduction of old tactics, the convoy, which always had with it ships fitted with special appliances capable of dealing with the new menace.

With the Second World War a new form of attack made its appearance, namely the long-range aircraft, which was used by the Germans in unrestricted warfare in contravention of the accepted rules of warfare at sea. This was a novel menace, and it is only true to say that it had never been really studied and faced up to, and so the Navy can hardly be said to have been ready for it.

From a naval officer's point of view it is rather interesting to think of how this lack of prevision and provision came about. Towards the end of the First World War the Navy had an air service of its own known as the Royal Naval Air Service. This was an integral part of the Navy and was manned entirely by naval officers and men. They made it their business to study air warfare over the sea, and by 1918 were making considerable progress. However, in 1918 the R.N.A.S. was abolished and the task of developing this form of warfare was entrusted to the Coastal Command of the Royal Air Force, which did it with what was known as the Fleet Air Arm. This particular entity concerned itself with the development of using aircraft flown from carriers. The set-up was that about one-third of the pilots and all the maintenance personnel came from the R.A.F. and the remainder of the officers from the Royal Navy. This introduced a system of dual control which in any arm of the services is not only uneconomical but inefficient.

However, in 1939 the control of the Fleet Air Arm was vested entirely in the Admiralty, and it became an integral part of the Fleet. As the direct result of the post-1918 policy, when the Second World War broke out the Navy was very



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THE HAWKER SEA FURY

short of senior officers with a thorough understanding of what air warfare over the sea meant. Also there was a desperate shortage of aircraft carriers, most of which were conversions from existing hulls.

Everyone knows that all economic and military activity, above what may be described as "starvation level," depends for this country on a constant flow of imports across the oceans. This flow in its turn depends on the security of the sea communications and, although the surface forces at the disposal of the Admiralty for this task were what may be termed just sufficient at first, the air component of the Fleet was totally inadequate. Consequently our shipping became a prey to the new form of attack—enemy long-range aircraft—which also, by their reconnaissance, helped the surface raiders and submarines on the trade routes. Neither the R.A.F. nor let alone the Navy had the aircraft to spare to deal with this problem.

Consequently by the beginning of 1941 the Merchant Navy had lost between one-quarter and one-third of its ships, and fifty per cent. of these losses were due to attack by shore-based aircraft. How much of their air effort the Germans put into this form of attack is not known, but a slackening off was noticeable when Hitler decided to attack Russia in June, 1941, and this slackening off went a long way to saving this country from disaster in the Battle of the Atlantic.

It was about this time that a small proportion of our air power was made available to assist in the control of sea communications, and air escorts became available to the convoys. Later converted merchant ships capable of flying off fighters made their appearance at sea and it is an interesting fact that the number of ships sunk in convoy with surface escort only was thirty times greater than when surface *and air* escorts were present. This clearly shows the value of the latter when present with the ships at sea.

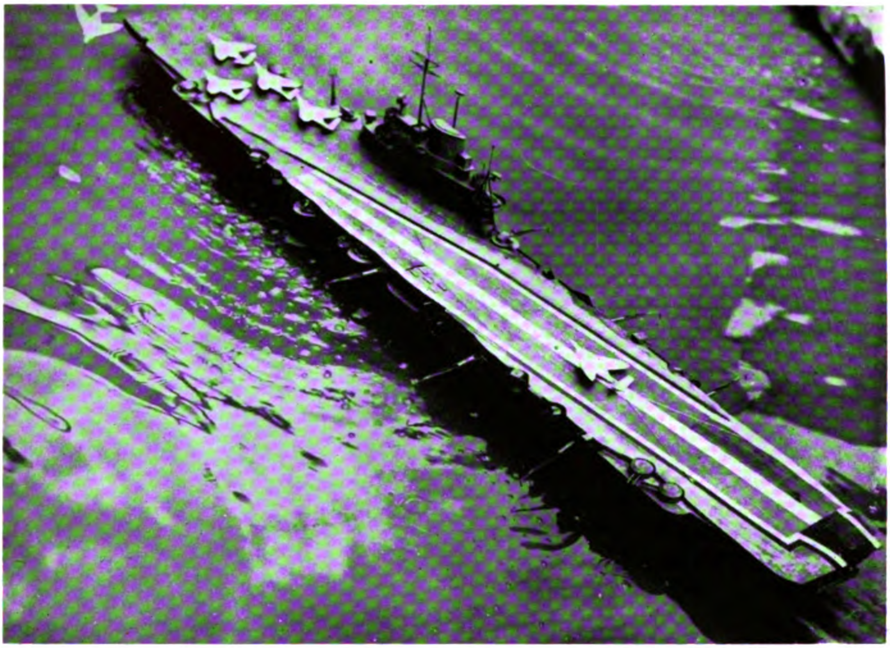
AIRCRAFT CARRIERS

To produce aircraft at the decisive point—the convoy—and in sufficient numbers, it is essential to be able to fly them from aircraft carriers. Aircraft flown from these can not only deal with attacking aircraft but can also attack surface raiders and submarines which may be threatening any ships at sea. In fact experience in the Second World War has clearly shown that the most efficient weapon which, on its own, can "locate and report, attack and destroy" a submarine is an aircraft. But it must be on the spot and not have to waste time in arriving on the scene of action.

There are many people who, quite honestly, look upon an aircraft carrier as both a very expensive and vulnerable way of providing aircraft at the decisive point. First to deal with the expense; a modern airfield costs something in the region of £8 million to construct and equip. A light carrier costs approximately the same, and unlike the airfield is mobile. True the carrier may be sunk, but an airfield may be captured and used by the enemy.

With regard to vulnerability; it must be remembered that of the 58 carriers which were used by the Navy in the last war, only eight were sunk. One of these was the *Hermes,* which was sunk by carrier-borne aircraft after she had landed all her fighters to assist in the defence of Ceylon. She was the only one sunk by aircraft.

That carrier-borne aircraft can be used to good effect in jobs other than defending ships at sea is borne out by the fact that, if it was not for the fact that Great Britain and the U.S.A. had carriers in Korean waters in June, 1950, no air support for the ground troops would have been possible.



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Model of Aircraft Carrier with new "angled deck" to make it possible to accept more aircraft and aircraft of higher performance.

So it is only right to point out that an aircraft carrier is a highly mobile, fully equipped airfield capable of bringing the aircraft in its hangars into action anywhere at sea at the shortest of notice. When properly equipped with fighters it is also capable of defending itself.

AIRCRAFT

To revert for a moment to the Spithead Naval Review. It must have astonished many people to see so many piston-engined aircraft take part in the fly past. This is not due to the Navy being out of date. In the foreseeable future the Fleet Air Arm will require a considerable proportion of propellor aircraft for anti-submarine and surface-ship strike duties. With their long endurance and carrying capacity they are just the thing for working over the sea.

However, to deny the enemy shore-based aircraft their power of interfering with our ships at sea, a first-class fighter aircraft is essential. There seems to be an impression that ship-borne fighters will never match the performance of shore-based. This is false. As the result of the introduction of angled decks, steam catapults and improved arrester gear, medium-sized carriers can now operate aircraft with higher take-off and landing speeds than can be operated from the conventional fighter airfields. True, naval aircraft must have heavier under-carriages for the loads they are subjected to. This is a small proportion of the fuel load carried. It therefore stands to reason that as long as naval fighters can operate nearer their carriers than the shore-based type, they are a match for the latter.

As for the reconnaissance types used at sea, they must have incorporated in them very efficient radar installations with which to give the earliest possible warning of enemies in the vicinity, both on, under and over the waters. For these and strike duties the high speed of the jet-propulsion type is not required. But that high speed is not forgotten is borne out by the fact that in the recent fly past the speed of the average types was in the region of 300 knots as compared with that of 85 knots for the Coronation Review in 1937.

As examples of what carrier-borne aircraft can do at sea it is only right to recall the way they put the Italian battle fleet out of action at Taranto and how they crippled the *Bismarck* and thus ensured her destruction. Incidentally there might have been a very different story in the case of the sinking of the *Prince of Wales* and *Repulse* had an aircraft carrier equipped with fighters been in the vicinity.

During the war in the Pacific the U.S. Navy never operated more than 1,500 carrier-borne aircraft, but with these they destroyed 5,000 of the enemy.

CONCLUSION

In 1917 and again in 1942 disaster was staring this country in the face due to the fact that the control of the sea communications was very nearly lost. In the first instance this was due to the submarine and in the second to a combination of submarine and aircraft. We had not got sufficient of the right weapons—fast anti-submarine craft and aircraft—to deal with the threats. It is on record that by the beginning of 1943 some 3,000 ships worth £250 million were lost. This not only interfered with our imports but also with our power to carry the offensive to the enemy in the distant theatres.

But gradually some of the air power used in attacking the back areas on the Continent was made available for use over the water. That, in combination with the make-shift carriers coming into service and going with the convoys, soon brought the losses within bearable proportions. In fact, in 1943 the number of

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THE FAIREY FIREFLY

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THE HAWKER SEA HAWK

U-boats destroyed began to exceed the number of ships sunk. Control of the sea communications was therefore re-established.

It stands to reason, therefore, that the Navy does not seek to use its air power as an end in itself, but as a way to retain the command of the air on, under and over the oceans.

Let us go back to the first principles for a moment. In any war the security of these Islands is the first essential. It is the security of the base. When that is secure and full war production is attained, then is the time to think of offensive operations. The wonderful victory by the R.A.F. in the Battle of Britain was a prime factor in ensuring this security. But it must be remembered that the security of the sea communications was of equal import. To lose the Battle of the Atlantic through lack of the power to ensure the security of our shipping would not only bring this country to the starvation level, but definitely prevent us from prosecuting the war.

With the advent of the long-range aircraft the Atlantic might well become in any future war what the Mediterranean did in the last war. This, of course, would mean disaster.

So it is now the object of the Navy to see in this period of uneasy peace that it has sufficient air power available at instant notice to deal with any threat to our sea routes. This air power cannot be built up in a night it must gradually be developed, methods must be kept constantly under review and above all the officers and men charged with this duty must be trained and, by constant practice, made efficient for the roles they might be called upon to play.

Viewing the Second World War in retrospect, the heroic and stupendous effort of Bomber Command stands out. In their policy of bombing the back areas their losses were something in the region of 22,000 aircraft and 79,000 officers and men. Was this really worth it? Did it produce a break in the morale of the civilian population? The thought at once springs to mind whether, if a small proportion of this effort had been devoted to the war at sea, the security of our sea communications would have been improved.

Finally the object of all the armed forces is to break the enemy's will to resist. From the point of economy and efficiency it stands to reason that they must work as a team with this object constantly in view. Co-operation and co-ordination between the Services is essential, and in this the naval point of view is that the security of the sea communications must be ensured so that the other two Services are at complete liberty to contribute their share to the common task.

THE ROYAL OBSERVER CORPS

BY AIR COMMODORE G. H. VASSE, C.B.E., R.A.F.
Commandant, The Royal Observer Corps

MOST people, if asked "Do you know there is a Royal Observer Corps?" would be able truthfully to answer "yes," but to many, even in the Royal Air Force—except in Fighter Command—very little is known about the Corps. This is not only due to the modesty of its members, but also because they are seldom seen. Their posts and centres are generally situated away from Royal Air Force stations and the observers usually go about their business in small numbers.

As its badge—a beacon lighter scanning the horizon—indicates, the Corps believes that its origin rests with these lookouts of Elizabethan times, searching seaward for the first signs of the Spanish Armada and ready to light the warning beacons. "Forewarned is forearmed" is its motto.

In 1914 bombs were dropped on England from an unheralded aircraft. Soon afterwards the first ground observer system was initiated and, as was natural then, came under the control of the Admiralty. The duties were carried out by the police and reporting was initially limited to aircraft seen or heard within sixty miles of London. In 1915 the area was extended to include the south-east quarter of England, and later the same year to cover the whole of England and Wales. In 1916 the War Office took over and a more regular system of observers was introduced. Military personnel were used, but this proved unsatisfactory and the police were again brought in.

In 1917 Major-General E. B. Ashmore, C.B., C.M.G., M.V.O., assumed command of the defences, and it was on his system that the Royal Observer Corps, as it is known today, was built. Although the speed of modern aircraft is very much greater than it was at that time, the main problem for a successful observation system remains the same. That is, to reduce to a minimum the delay between the moment an observer first sees or hears an aircraft and the time when the Air Force Commander receives that information.

General Ashmore established the London Air Defence Area, a system covering the London area and districts to the south-east and south of London, which was considered the main danger area at that time. He included in the scheme aerodromes, emergency landing grounds, observation posts, gun sites, searchlight sites and balloon sites. These units were treated as observation units connected to a number of sub-controls. At the sub-controls the reported movements of aircraft were plotted and "told forward" to a central control. The system demanded a great deal of telephone construction work and was not completed until September, 1918. It was too late for use in the First World War, since there were no raids after March, 1918; but it proved its worth in exercises and established the principles later employed in the Corps.

The Corps as we know it today had humble beginnings in 1925, when three groups were formed in Kent, Sussex and Surrey, again manned by special constables and this time under the control of the Home Office. In 1929 the Air Ministry took over operational control and Air Commodore E. A. D. Masterman, C.B., C.M.G., C.B.E., A.F.C., was appointed to command. During the next ten years it expanded to forty groups and in 1939 the Air Ministry assumed complete control and the personnel ceased to be special constables. For fourteen years this voluntary organization had existed without a break, had gradually

A TYPICAL R.O.C. OPERATIONS ROOM

expanded until all of Great Britain, with the exception of north-west Scotland, was covered by its network, and it was then ready to take its part, a vital one, in the Second World War.

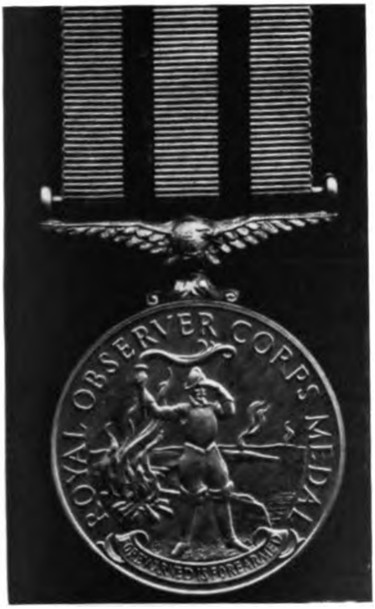
Internal reorganization and domestic changes were made during the war, but the main operational principles held throughout. Owing to shortage of manpower, women officers and observers were introduced in 1941. The women observers were mainly employed in the operations rooms, but whether there or out at the observation posts they fully justified the confidence reposed in them. (Even as far back as 1925 the Chief Constable of Essex had suggested that women might be employed on Observer Corps duties.) After a stand-down period beginning in May, 1945, the Corps was re-formed in January, 1947. Today it has the status of a Royal Air Force Group in Fighter Command, is commanded by a serving Air Commodore and is an integral part of the control and reporting organization of the Command.

The officers and observers wear R.A.F. uniform with special insignia. Except for a nucleus of whole-time officers, they are spare-time volunteers, unpaid in peace time, but receiving small grants and allowances designed to cover out-of-pocket expenses. (In Elizabethan times the beacon-lighters were paid for their services by the County Sheriff.) The male members are mostly over military age or not available for military service. A small percentage of youths under military age are also accepted.

The members are not subject to the Air Force Act. The Corps has a simple disciplinary code of its own and, in fact, discipline based on loyalty and common sense is of a high standard. A Long Service Medal is awarded for twelve years' satisfactory service. but whole-time officers must serve twenty-four years to qualify.

The personnel come from all walks of life, and one meets retired Service officers, artisans, farm hands, senior civil dignitaries, foresters, eminent business executives, fishermen, secretaries, shop girls and lawyers, all working in complete harmony, proud of their Corps and determined to uphold its efficiency and good name. There are several members with close on thirty years' service, and many instances of fathers, sons and daughters, and husbands and wives, serving.

The present strength of the Corps is about sixty-five per cent. of its establishment, and while this is not regarded with complacency, it compares very favourably with other voluntary organizations. To fulfil its role efficiently the Corps must, of course, be up to establishment. Experience has shown, as one would imagine, that a policy of recruiting for quality rather than quantity pays dividends. Since the war many ex-Service men and women have joined; they are good material, and the role of the Corps and the cheerful comradeship found therein definitely appeal to them. Again, observers bring their friends and these are invariably the right types.



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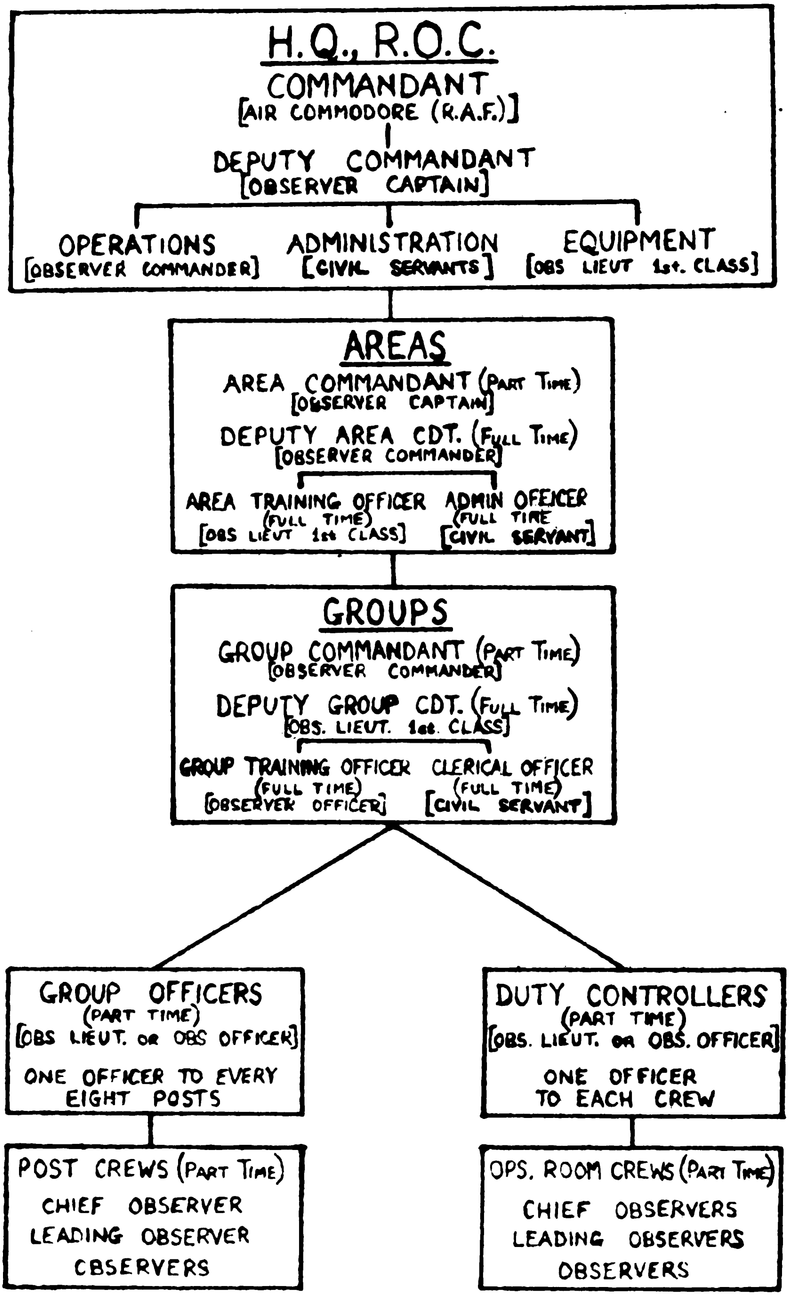
R.O.C. LONG SERVICE MEDAL
Colours; Light Blue, Dark Blue, Silver, Dark Blue and Light Blue.


H.Q., R.O.C.
COMMANDANT
[AIR COMMODORE (R.A.F.)]
DEPUTY COMMANDANT
[OBSERVER CAPTAIN]
OPERATIONS
[OBSERVER COMMANDER]
ADMINISTRATION
[CIVIL SERVANTS]
EQUIPMENT
[OBS LIEUT 1st. CLASS]
AREAS
AREA COMMANDANT (PART TIME)
[OBSERVER CAPTAIN]
DEPUTY AREA CDT. (FULL TIME)
[OBSERVER COMMANDER]
AREA TRAINING OFFICER
(FULL TIME)
[OBS LIEUT 1st CLASS]
ADMIN OFFICER
(FULL TIME
[CIVIL SERVANT]
GROUPS
GROUP COMMANDANT (PART TIME)
[OBSERVER COMMANDER]
DEPUTY GROUP CDT. (FULL TIME)
[OBS. LIEUT. 1st. CLASS]
GROUP TRAINING OFFICER
(FULL TIME)
[OBSERVER OFFICER]
CLERICAL OFFICER
(FULL TIME)
[CIVIL SERVANT]
GROUP OFFICERS
(PART TIME)
[OBS LIEUT. OR OBS OFFICER]
ONE OFFICER TO EVERY EIGHT POSTS
DUTY CONTROLLERS
(PART TIME)
[OBS. LIEUT. OR OBS. OFFICER]
ONE OFFICER TO EACH CREW
POST CREWS (PART TIME)
CHIEF OBSERVER
LEADING OBSERVER
OBSERVERS
OPS. ROOM CREWS (PART TIME)
CHIEF OBSERVERS
LEADING OBSERVERS
OBSERVERS

Recruits are forthcoming and, strictly speaking, recruiting is not the real difficulty. The problem is to cut down wastage and it is not an easy one. There is little doubt that once recruits have passed the initial stage and feel they "belong" to the Corps they want to stay. A great many do so for years, but in these stringent times private claims are pressing and too many observers are forced to apply for their release for domestic or business reasons.

The role of the Corps has remained unchanged, except in one important particular, since 1925. Strange to relate, right up to the outbreak of the Second World War the Corps was not required to recognize the various types of aircraft. It merely had to report every aeroplane seen or heard, irrespective of type, although provision was made to distinguish between bombers and fighters, regardless of nationality. Then it was soon realized that better use could be made of the Corps; that it should not only recognize friend from foe, but be able to identify the various types of aircraft. This art of aircraft recognition proved one of the most attractive duties performed by the post personnel; they rapidly became expert and their keenness has persisted.

The role of the Corps today, then, is to identify, when possible, and report the movements of all aircraft over Great Britain. It also has a number of subsidiary duties, and these are to report: Aircraft in distress, emergency landings and crashes, parachute descents, airborne landings, enemy bombing, marker flares and minelaying; and the approach of enemy forces by land or sea.

During the last war a scheme was developed for the Corps to warn aircraft approaching high land obscured by clouds; warning was given by flares and, in addition, certain posts equipped with radio signalled the warning. In the event of another war there is little doubt that this function of the Corps will be reintroduced.

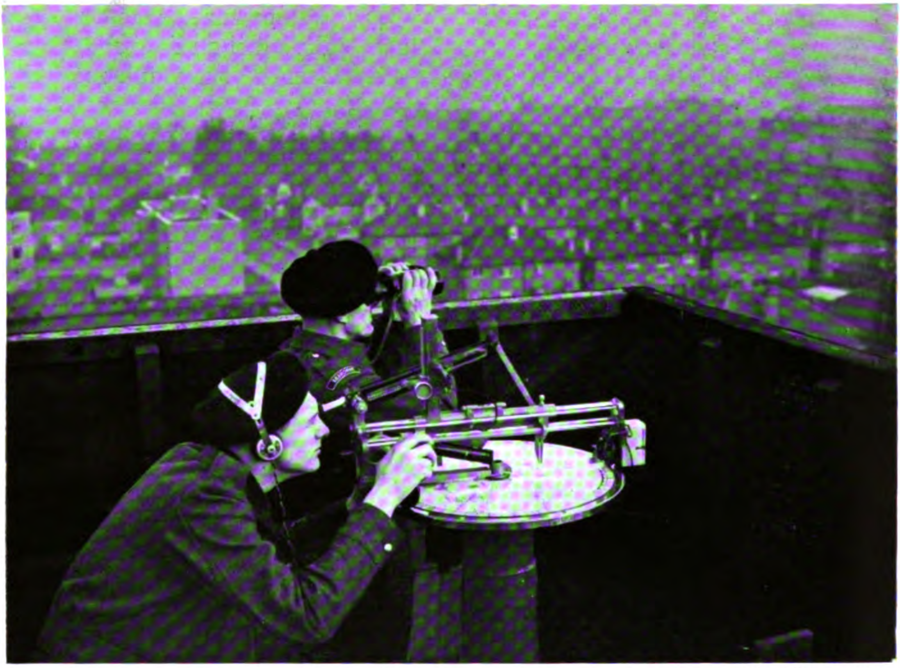
The organization of the Corps is shown diagrammatically opposite. Under Corps Headquarters there are five areas, together commanding thirty-nine groups. Each group consists of an operations room or centre and up to sixty observation posts. The complete Royal Observer Corps network totals some 1,500 posts.

Reports from posts are plotted on the main plotting table in the group operations centre and told forward to the R.A.F. operations centres. To provide early warning of approaching aircraft each group centre has an ancillary plotting board, known as the long-range board, upon which is plotted aircraft intelligence received from adjacent groups and, when appropriate, from coastal radar stations.

The above gives a brief picture of the history, organization and character of the Corps. One's next question naturally would be "What has it done?"

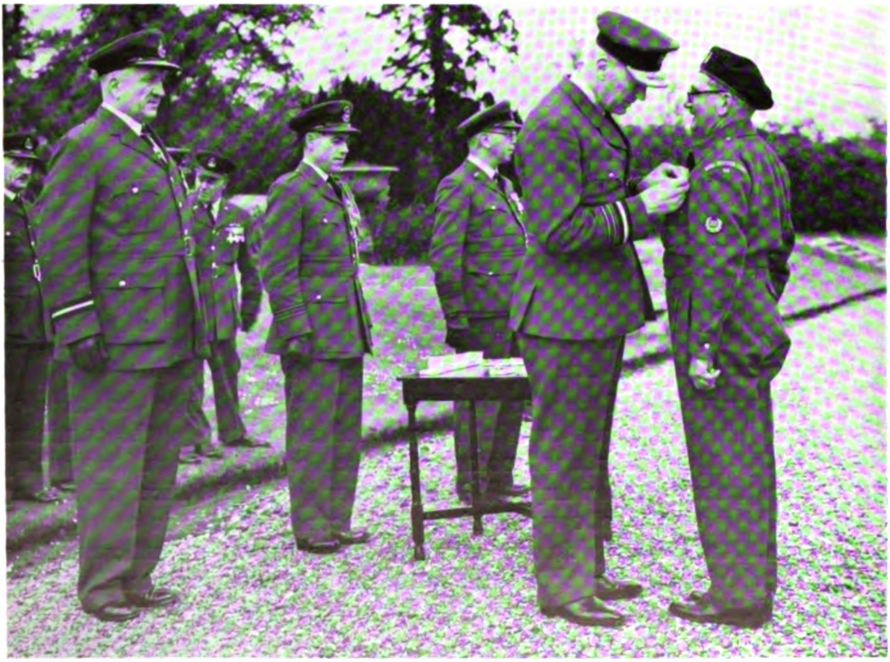
In the early months of the war, the "Phoney War," advantage was taken of this limited activity to iron out the many problems caused by the continual manning of posts and operations rooms and to press on with recognition training and sound plotting. In January, 1940, the Senior Air Staff Officer of Fighter Command reported as follows: "This is the second occasion in a week that posts in East Anglia have picked up and plotted by sound a raid that crossed the coast at 30,000 feet . . . very creditable, considering the great height and adverse weather." Next came the Battle of Britain.

Unspectacular as the work of the Corps was during this battle, the complete picture given by identification, strength, estimated height and accurate plotting of enemy formations, together with similar details of our own formations, was invaluable to the R.A.F. Controllers. It was soon realized that these men could



[Air Ministry Photo

A ROYAL OBSERVER CORPS POST



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Presentation of the Long Service Medal by Air Marshal Sir Dermot A. Boyle, K.C.B., C.B., A.F.C., Commander-in-Chief Fighter Command, to Chief Observer A. N. Howes.

be relied upon absolutely and their reports supplied the information upon which the majority of the interceptions were made during this famous battle. They too were usually the first in with details of shot-down enemy aircraft, our own casualties and surviving pilots.

A particular strain to which observers were exposed while on duty was due to their knowledge of their localities and the vantage points from which they watched the bursting of bombs, for they knew that these were occurring in areas in which their homes stood.

About this time experiments were made in giving Imminent Danger Warnings to specific factories engaged in vital war work, the aim being to cut to a minimum the loss of production time. These were so successful that the Ministry of Home Security then installed Air Raid Warning Officers in Royal Observer Corps operations rooms and the scheme was considerably extended, in certain instances specific posts even being responsible for issuing warnings. Eventually this system achieved the largest saving in production hours of any single system during the war.

In April, 1941, a great honour was conferred upon the Corps and was announced in the House of Commons by the Secretary of State for Air, as follows: "I am happy to inform the House that, in recognition of the valuable services rendered by the Observer Corps over a number of years, His Majesty The King has been graciously pleased to approve that the Corps shall henceforth be known by the style and description of 'The Royal Observer Corps'."

A month later the Me. 110 flown by Rudolph Hess to the vicinity of Glasgow in May, 1941, was accurately identified and tracked from crossing the coast to its crash. Its identification was considered highly improbable since a Me. 110 had not the range for the round flight. Incidentally, Major Graham Donald, of the Royal Observer Corps, Glasgow Group, shortly after the crash, again identified the aircraft as a Me. 110 and also, having met the pilot at the local Home Guard Headquarters, reported "The name may be Alfred Horn, but the face is the face of Rudolph Hess." For this evening's work the following Air Ministry message was received by the C.-in-C. Fighter Command:

"I am to ask that you will request the Commandant to convey to the crews of the posts who were on duty at that time at A3, F2 and G1, the Chief of the Air Staff's appreciation of their work. The accuracy with which the aircraft was identified is commendable, having regard to the fact that the appearance of a Me. 110 in these areas was most unusual. I am also to request that the Commandant should convey a similar commendation to Major Donald for the part he played in the incident."

With the advent of the low-flying tip-and-run raids on the south and south-east coastal areas, a large number of satellite posts were quickly constructed along the coast to provide complete low coverage to back up the radar system. These proved most successful. In addition, air raid warnings to many coastal towns were sounded direct from Royal Observer Corps posts.

The V1, or flying bomb, offensive provided a chapter of intensive activity for the Royal Observer Corps southern area. The Dymchurch post identified and reported the very first of these weapons, and within seconds the defences were in action. From then onwards the posts and centres were really busy, and despite forecasts to the contrary, their tracking of these jet bombers was so excellent that R.A.F. Controllers took their radio equipment to the centres of Horsham and Maidstone and vectored the fighters from these Royal Observer Corps plotting tables.

A special role was to be given to the Corps in connection with the invasion of Normandy. Air Chief Marshal Sir Trafford Leigh-Mallory, K.C.B., D.S.O., the Allied Air Commander-in-Chief, wished to ensure that the gunners aboard merchantmen would engage enemy aircraft speedily and, at the same time, that they would not engage friendly aircraft. He had the happy thought of using Royal Observer Corps personnel as spotters or aircraft identifiers.

Some 800 officers and observers were trained for this duty. After training they temporarily entered the Royal Navy as Petty Officers for special duty and served on Allied merchantmen of all nationalities. The observers quickly gained the complete confidence of the gunners and crews by their expert service, and the scheme proved an outstanding success. The operation was named "Seaborne," and many officers and observers still serving in the Corps proudly wear the "Seaborne" shoulder badge.

When VE Day came the Corps could, with justification, claim it had done a really good job of work.

Since its re-formation in 1947 the Corps has participated in all the major air exercises and many local ones. The personnel are never happier than when able to participate in large-scale exercises providing plenty of practice in identification and reporting.

The winters are occupied with synthetic exercises and other forms of training and culminate in the annual tests held in March. Every observer must pass a preliminary test, or better each year, in order to be retained in the Corps, but the intermediate and master tests held in March are voluntary. The master test consists of a recognition film and two written papers for post observers, and a practical plotting test and two papers for the centre observers. To gain the Master Badge, issued in the form of a "Spitfire" arm badge, an aggregate of ninety per cent. has to be achieved. Such is the spirit in the Corps that, despite the various difficulties involved, not least of which is the fact that the tests have to be held on one given day throughout the Corps, well over two-thirds of the observers took the tests this year.

As an example of typical keenness the following instance is worth quoting: In 1952 a woman observer who was visiting her husband in the Argentine requested permission to take the tests at the British Embassy in Buenos Aires. Arrangements were made accordingly and it is happily recorded that she passed the test, and gained a "Spitfire."

A series of five weekly training camps are held annually at a Fighter Command station, and are voluntarily attended by some 3,000 observers. These camps, in addition to providing special training facilities, afford invaluable opportunities for observers from all parts of Great Britain to meet and broaden their Royal Observer Corps views.

What lies ahead? Crystal gazing is notoriously unreliable, but one might make a reasonable forecast on logical lines. The Corps is able to cope satisfactorily today and unless there are some very radical changes in air warfare, should be able to do so for many years to come.

Some are apt to regard radar as in competition with the Royal Observer Corps, whereas they are complementary. The Air Commander wants, in fact needs, the maximum he can get from both. It will be many long years before we can dispense with the very positive and detailed intelligence supplied by the eyes, ears and brains of the Royal Observer Corps—the Corps which the Queen has honoured by becoming its Air Commodore-in-Chief.

THE AIR FORCES IN PARLIAMENT

Apology is offered for an error in the previous article in this series. On page 256 of the July number of THE ROYAL AIR FORCE QUARTERLY *(Vol. 5, No. 3, New Series) the aircraft named in line 15 should, of course, have been the Vickers Valiant, not the Vulcan. The author wishes to state that he alone was responsible for the mistake.*

DEBATE ON DEFENCE

THE Defence Debate in the House of Commons on 29th July, 1953, was well supported and many valuable contributions were made, particularly by Mr. Emanuel Shinwell (a former Minister of Defence) and Mr. Arthur Henderson (a former Secretary of State for Air) from their vast funds of knowledge and experience.

Mr. Shinwell began by asking three pertinent questions: (i) Are we proceeding along the right lines? (ii) Are we spending the funds available for defence to the best advantage? (iii) Have we the right conception of defence? He expressed a fear that in allotting funds for defence to the three Services, the amount and proportion each Service got was dependent more upon the strength of the case made out by men who were naturally (and commendably) loyal to their own Service and less upon the actual function of each Service in the whole scheme of defence as assessed by an impartial authority.

While this fear is natural and should be expressed, it does not appear to have much foundation in fact. There are two impartial authorities who assess the needs of the three Services in relation to their functions: the Ministry of Defence and the Treasury. Each Service Department makes out its own estimates in the first instance and supports its case with the strongest factual arguments it can produce; and there is no other body competent to do this. But it is not the Service Chiefs who make out the final case; it is the senior Civil Servants attached to the Service Department who do it, because they have been trained to the technique. No emotion is allowed to enter into it. If there were, it would spoil the case. As Sir Robert Morton, the eminent K.C. [*sic*] in Terence Rattigan's play, "The Winslow Boy," said, "cold logic—and buckets of it—is the only thing that counts."

Mr. Shinwell also drew attention to the progress made in weapons of destruction, e.g., the atom bomb, guided missiles, rockets, bazookas, tanks and jet aircraft; and he wanted to know why, in view of these modern refinements, Her Majesty's Government were still providing "conventional weapons." With the courage for which he is famous, he asked: "Do we require a Navy such as we have at the present time?" And were all these great aircraft carriers really necessary at £13 million each? It had been suggested that aircraft carriers might become obsolete in a few years time, just as battleships had become obsolete. But *The Times* in a recent leading article drew attention to a possible new use for battleships as launching platforms and controlling units for guided missiles. And, in any case, until guided missiles take the place of piloted aircraft, it will be difficult to imagine how the services of aircraft carriers can safely be dispensed with.

The Lord Privy Seal, Mr. Harry Crookshank, told the House of two recent changes in the command structure of N.A.T.O. forces in Europe. "There is now established," he said, "a fourth Commander-in-Chief, that is to say the Commander-in-Chief of the Central European Sector, Marshal Juin, with co-equal navy, air and army commanders responsible to him." That will relieve the Supreme Commander of the duty of co-ordinating the operations of the central sector and leave him free to exercise control over the whole wide front from the North Cape to the Mediterranean. The second change affects the Deputy Supreme Commander (Air) at S.H.A.P.E. He will now have a dual role. He will have (i) to define the general air policy of the organization, and (ii) to control the air operations so as to ensure their co-ordination and in particular the co-ordination of strategic air forces which do not come under the Supreme Commander.

Mr. Crookshank also said it had been suggested that the appointment of a British officer as Tactical Air Force Commander in the central sector under Marshal Juin was "some denigration of the Royal Air Force and some reduction in the status of our command." There was no denigration and no reduction in status. Air Chief Marshal Sir Basil Embry now commands the largest operational air command in peace time, including squadrons of the Royal Air Force, of the Royal Canadian Air Force, of the United States Air Force and of the air forces of Belgium, the Netherlands and France—"to train them in peace and to command them in war." "This," said the Lord Privy Seal, "is one of the key positions in the whole organization. . . . The whole of the Royal Air Force may feel proud that an Air Chief Marshal occupies this post."

Mr. Arthur Henderson, after calling for a review of the policy of National Service with a view to the reduction of the period from two years to twenty-one months or eighteen months, praised the efficiency with which the Royal Air Force Review at Odiham on 15th July had been organized and carried out. But he said there was general disappointment that the Hunters and Swifts, whose prototypes gave such a remarkable performance, were not yet in service with the R.A.F. It was more than two years since the orders for these aircraft were placed, but still they did not appear to be coming off the production line, in spite of "super-priority." The Canberra, he said, had been ordered early in 1949 and the first squadron of Canberras was formed in the autumn of 1951—about 2½ years after the first orders were given, and without "super-priority." He asked when the Hunters and Swifts were likely to come into squadron service; and also the Valiant, the first of the three four-jet bombers, when would that be in squadron service?

Next he asked why the seventy Washingtons (B29's) lent to us by the U.S.A. were being returned before the "V"-class medium bombers were ready to take their place. Would not this seriously weaken Bomber Command at a time when it ought rather to be strengthened? Having expressed his doubts, based on reports by the Commander-in-Chief of the Second Tactical Air Force, of the efficiency of the radar chain facing the Iron Curtain, he proceeded to suggest that, with the development of scientific warfare, more attention should be paid to defence against rockets and guided missiles generally. *The Times* had reported on 17th July that the Russians were now able to produce 24,000 supersonic missiles of an improved V2 German pattern each year, that a single launching ramp could fire off missiles at the rate of 800 an hour, and that Russian engineers were trying to perfect and produce in quantity a 97-stage rocket with a range of 2,500 miles. What, he asked, was the Government doing on the research and development side to provide counter-weapons to the rocket?

"It seems to me," continued Mr. Henderson, "that we must face the fact that there can be no perfect air defence and that absolute safety cannot be guaranteed. Some months ago Lord Trenchard told us that the best defence was the power of attack. On the other hand, a number of American scientists recently reported that perfect defence against air attack is unobtainable and completely impracticable economically and technically in face of the expected advances in potential hostile offensive capabilities."

DELAYS IN PRODUCTION

Reverting to Mr. Henderson's complaint about the delays in producing Hunters and Swifts in numbers for squadron service, it is significant that the Aeronautical Correspondent of *The Times*, writing on 17th July of the R.A.F. Review at Odiham, said that the only really modern aircraft now in service with the R.A.F. were the Canberras and the American-designed Sabres. At the end of the fly past came six "aircraft of the future" which, he said, were "soon to join them" (he referred, of course, to the Hunter, Swift, Javelin, Valiant, Victor and Vulcan); and he added: "These were welcome signs that the R.A.F.'s days of obsolescence in first-line aircraft are nearly at an end."

Lord Trenchard, in a letter to *The Times* on 20th July, 1953, took this point up and urged those concerned to reduce the long and lengthening period which now elapses between orders and deliveries of aircraft. He wrote:

"I wish I could think that the 'V'-class four-jet bombers . . . would soon join the Canberras and the Sabres. . . . It is nearly two years since I saw the first Valiant fly; it is a year since I myself flew in it; and still, I understand, the R.A.F. has only one of these machines. . . . I am convinced that a new conception of the task of production is now necessary. . . . I feel that if a few of the leading aircraft makers of this country were called in and told we want enough machines—and their complete equipment—to put five squadrons of each type of long-range jet bomber in the air in eighteen months or two years, a way would be found. . . . The brains of those who direct the production of these machines must be given a chance to match the brains of those who design them. . . . These long-range bombers are vital to our defence and to keeping the peace of the world."

This is indeed a serious matter, and Lord Trenchard, with his usual acumen and force, has not only put his finger on the weak spot but also shown us a remedy. It is realized, of course, that if we are to be equipped with up-to-date aircraft just when we need them most, we must be content with a measure of obsolescence from time to time. For financial reasons we cannot always be on the top line. But this periodical weakness is disquieting. A leading article in *The Times* of 29th July, 1953, asks: "If there is no major war in fact, is it acceptable when for three or four years in each decade the country is not ready to defend itself?" And it goes on to say: "New weapons may cease to be world-beaters if production delays in this country enable other countries to wipe out the British lead. . . . And in war such delays mean the loss of brave men's lives—and, probably, of battles."

The Parliamentary Secretary to the Ministry of Defence, Mr. Nigel Birch, admitted the delays and pleaded that they were partly due to modifications in design. "The difficulty with modern types of aircraft," he said, "is that, more often than not, the prototype bears only a very partial resemblance to the aeroplane when it finally enters a squadron. Between the statement of staff requirements and the operational modifications there are invariably improvements, new devices added and technical developments incorporated. The recent practice of ordering off the drawing-board naturally complicates the problem still further." Mr. Nigel Birch also pleaded that supersonic aircraft presented "new constructional problems on which there is no fund of experience on which to call."

Captain Robert Ryder also complained of delays in the development stage, and suggested that if the reasons for delay were modifications introduced after placing orders, then these modifications should not be allowed but should be deferred until the next design is called for. Captain Ryder, who is particularly interested in the Fleet Air Arm, also expressed the need for a complete amalgamation between Coastal Command and the Admiralty, on equal terms.

Doubtless what the Parliamentary Secretary to the Ministry of Defence said is true; but the delays are very serious, and they will get longer if they are not watched. If they get much longer, all our new aircraft will be obsolete before they are put into service, and we shall never be on the top line at all. It was, however, reassuring to read Mr. Nigel Birch's statement that "the Swifts will be in squadron service this year (1953)," that "the Hunters will follow fairly close behind," and that next year (1954) the Valiants will be in squadron service.

RETIRED OFFICERS' PENSIONS

The payment of adequate and equitable pensions, though not directly affecting serving officers personally, is bound to affect the future recruiting of officers for the three Services, as well as a number of the older retired officers whose pensions were fixed when the cost of living was considerably less than it is at the present time.

This question has been raised from time to time in both Houses of Parliament. It was again raised in the House of Lords on 17th June, 1953, by Lord Schuster and in the House of Commons on 31st July, 1953, by Brigadier Peto. In both Houses the demand for revision was well supported.

The hardship that gave rise to these debates is based on the fact that officers who retired before 1st September, 1950, receive pensions on lower scales than those who retired after that date. From 1938 there has been a steady fall in the purchasing power of the £. This has been reflected, to some extent, in the revised pension scales of 1946 and 1950; but retired officers drawing fixed pensions have inevitably suffered progressively. Officers who retired in the early 1940's, whose pensions were assessed on the basis of the purchasing power of the £ in 1938, are now getting only 8s. 10d. in present-day values for each £ of their pensions.

Her Majesty's Government were urged to raise the retired pay of all officers who retired at any time before 1st September, 1950, to the rates applicable to those who retired after that date. Brigadier Peto said this was a simple and just request and it would cost the country about £2,000,000 per annum.

Yet it is not so simple as it may seem and would certainly involve expenditure far exceeding the sum quoted. If these increases were granted on principle, as seems desirable, the same principle would have to be applied to the pensions of other ranks, to Civil Service pensions, National Insurance benefits, compensation for industrial injuries, war pensions and many other such allowances, which together would cost the country a very considerable sum of money.

The Minister of Defence assured the House of Lords, and a similar assurance was given in the House of Commons by his Parliamentary Secretary, that Her Majesty's Government were giving their most anxious and sympathetic consideration to the problem; but their primary task at present was to restore the economic health of the country, and so they were forced, however reluctantly, to resist many well-founded and desirable claims to extra expenditure.

CURRENT EVENTS

THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS (NEWS ITEM)

The Philosophy of the Light Fighter

One of Great Britain's leading aircraft designers believes that a small, light jet fighter can be built at about one-third the weight of a conventional fighter, and that therefore almost five times as many can be produced in a given time and at a quarter the cost. It will be a day fighter only, but capable of meeting any expected attack by fighters or bombers.

The designer, Mr. W. E. W. Petter, designer of the Canberra, has already announced that his company, Folland Aircraft, is building a prototype light fighter as a private venture, called the Gnat.

The armament would be two 20 or 30 mm. guns or four 5 in. guns, and adequate ammunition. There would be wide-range radio facilities, some form of navigational aid, and possibly radar ranging for the guns. There would be a lightweight ejector seat.

For a given sum of £6,000,000, it is estimated that it would be possible to buy 900 of the small fighters as against 215 of the larger—that is rather over four times as many.

More News About the Angled Deck—A New Technique for Carriers

The advantages of this are best seen when compared with the conventional arrangement. On a normal Fleet carrier there is about 800 ft. of deck free for flying operations. The first third of this is taken up by arrester wires, which pull the landing aircraft up short; the middle third is taken up by the tennis-net type barriers, which halt any aircraft whose hook fails to engage with the arrester wires; the third of the deck farthest away from the touch-down point is a clear area used for parking.

The angled deck does away with the need for extensive barriers because any aircraft which fails to hook on to a wire can overshoot straight on out to sea and go round again, without fear of running into parked aircraft. Because of this extra safety factor it is possible to use only half the number of arrester wires (so saving space).

The first practical trials were made on the British carriers *Triumph* and *Illustrious*. Then full information about the new development was passed to the U.S. Navy, which decided to convert a big carrier, the *Antietam*. The cost of conversion was about one million dollars, but following on trials with many different types of aircraft, including British jets, the considered opinion is that this expenditure has already been regained in reduced damage to aircraft.

To date, more than 5,000 landings have been made on the ship. Of eighty pilots who landed, fifty had never flown a jet on to a carrier before and thirty had never landed on a carrier at all before. There were no accidents. During the 5,000 landings, 115 aircraft failed to engage with the arrester wire—mainly because the hook hit the deck too hard and bounced over the wires. Normally every one of these 115 aircraft would have run on into the barriers, causing some major or minor damage.

The trials have therefore convinced the British Admiralty and the U.S. Navy of the angled deck's advantages. H.M.S. *Hermes* will be fitted with it next, and two more American carriers are to be converted shortly.

The de Havilland Gyron Jet Engine

This new engine, still shrouded in secrecy, is an axial-compressor type of turbine which at the same time features exceptional simplicity and low weight. It is intended for supersonic fighter aircraft. It has been giving on test an output greater than announced for any other jet engine.

The Gyron was giving very high thrust within the first few weeks of its running on the testbed—thrust such as a new engine might not be expected to achieve in much less than a year; it has also given satisfactorily low specific consumptions and a high degree of reliability.

In its first phase of development, the Gyron is intended for supersonic fighter aeroplanes. Simplicity and low weight features of the design, are especially valued in this role. At the same time, by reason of the vast background of operational experience with the Goblin and Ghost, and the unique opportunity of developing the Ghost up to airline standards—far more exacting than for military duty—de Havilland have found it possible to build into the Gyron features which may be counted upon to give durability with high reliability. Some B.O.A.C. Comet engines in public service are now running to 750 hours between overhauls; the larger Gyron engine embodies all this background of practical knowledge.

For reasons of secrecy nothing can be said at the present time about de Havilland plans for future fighters. Neither may deductions be drawn concerning airliners to succeed the Comet 3. But the significance of a high-powered de Havilland engine of low specific consumption, diameter and weight, with qualities of high reliability and durability, is obvious.

More Details of Woomera's Pilotless Jet

More details are now available of the performance of the "Jindivik" pilotless jet target aircraft developed in Great Britain and being test-flown on the rocket-range at Woomera.

It is a small, lightweight, high-speed aircraft which takes off, manœuvres and lands under the remote control of an operator on the ground or in another aircraft. It is launched along a runway from a detachable trolley and lands on a belly skid.

It is built from cheap materials so that if hit it is expendible, but if it is not hit it will land and fly another day. The aircraft has a streamlined fuselage 22 ft. long and thin wings of 19 ft. span. Tests are already well ahead on the twelve of the Mark 1 type, which have the 1,000 lb. Adder jet engine. The Mark 2 has a Viper engine giving 1,600 lb. thrust.

The "Jindivik" takes off on a tricycle trolley, the nose-wheel of which is steered by a gyro-control system. As soon as the airspeed indicator reaches the pre-set take-off speed, an electrical circuit is closed, and this automatically applies the elevators to give the necessary "nose-up" attitude.

At this point the trolley is released and simultaneously brakes are applied to its rear wheels, so that the trolley pulls up on the runway. It is therefore an undercarriageless, streamlined missile when in flight.

Jet Bombers can be Flying Tankers

The flight-refuelling technique for increasing the range and load of bombers by supplying them with fuel from aerial tankers has been developed a stage further by British experts. They have modified the standard aerial hose so that it is now in the form of a "pack" which, when loaded into the bomb-bay of a bomber aircraft, can turn it, in a matter of minutes and very economically, into a fuel-giving tanker.

There is no need, as was once thought, to build special tanker aircraft for the bomber fleets of the future. With very few adjustments, standard squadron bombers can now be converted to aerial tankers which will feed fuel to the other planes in the squadron. A standard jet bomber also needs only minor modifications to turn it into a fuel receiver.

This is possible because all modern aircraft are now designed for high-pressure refuelling on the ground (that is, pumping the fuel in under pressure instead of pouring it in with gravity feed alone)—and 95 per cent. of this equipment is identical with that needed for air-to-air refuelling. The pipes and plumbing of the fuel system are almost the same in both cases. And the British "probe and drogue" supply system is light and small enough to be fitted quickly into a standard bomb-bay, leaving plenty of room in the bay for extra tanks. Plans have been made for air-to-air refuelling for the latest high-speed jet fighters and bombers. These envisage transferring fuel from a tanker to a fighter or bomber at a rate of 1,000 gallons a minute at heights of 40,000 ft., while both planes are flying at over 460 m.p.h.

Louder Psychological Warfare

The latest form of aerial warfare tested in Malaya is a louder form of "air-shouting"—the technique of using air-to-ground loudspeakers mounted in aircraft. Previously this type of psychological attack had been tested mainly in light aircraft, but now a British firm has developed extra-loud equipment which is mounted in a battery of four speakers beneath the belly of a large Valetta transport.

Altogether the battery of speakers has about forty times the power of an ordinary outdoor public-address system. Normal practice is for the Valetta to fly 1,500 ft. up, and this gives the speakers a range of about one mile.

Ideally, an hour's trip would mean that 100 square miles of territory could be covered, but cloud, wind and air bumps reduce this.

It has been found in Malaya that the loudspeaker is an ideal replacement for the leaflet raid, because while a terrorist who was seen reading a "surrender" leaflet was not popular with his fellow-bandits, the same man could listen with impunity to the loudspeakers. The loudspeaker is also more certain to reach him.

Another use for the "voice aircraft," as the Valetta is called, is to assist aircrews who have parachuted out over the jungle to make contact with rescue patrols by guiding them together.

Radar Warns of Storms

British technicians have for some time been developing airborne radar sets to warn pilots that storms are approaching and now new equipment is being developed for installation on the ground at airports to give warning of storm clouds in the area dangerous to aircraft.

A Decca Company prototype set is now being tested in service at Entebbe, Uganda, Africa. The equipment consists of four units—a scanner, receiver, a screening-unit and a power unit. The display unit is fitted in a light alloy case, which also contains all the controls.

It has proved capable of registering the position of dangerous clouds well over one hundred miles away, and improved models are being developed which it is hoped will have longer range still.

A Skylark in the Sky

The new British sailplane, the Skylark, has entered its first championship contests in Britain, and is doing well.

The Skylark, as its name implies, is a diminutive version of the famous Sky, also built by Slingsby's, which won the International Championships in 1952.

The new sailplane is an ultra-light type which by incorporating the best features of the Sky has flying qualities never before possible in a small model with only 45 ft. span.

Special production methods have been used to cut costs. The wings are attached to the fuselage by pins, so that the sailplane can be assembled or dismantled for transportation very quickly. To reduce costs, there is no landing wheel, but a jettisonable landing trolley will be supplied to special order. The main skid is sprung with rubber shock absorbers and there is a conventional tail skid.

Technical Data.—Dimensions: Span, 45 ft.; length, 20 ft.; wing area, 113 sq. ft.; aspect ratio, 17.9; weight, maximum all-up 620 lb.

Performance: Best gliding ratio 1 in 27.3 at 46.3 m.p.h.; minimum sinking speed, 2.34 ft. per sec. at 41.6 m.p.h.; flying speed at 6 ft. per sec. sink, 74.5 m.p.h.; minimum speed, 37.4 m.p.h.

ITEMS FROM AIR MINISTRY NEWS SERVICE

Low Flying—Why it is Necessary

Low flying by R.A.F. aircraft, regarded by many during the war as a stirring spectacle, has become a centre of controversy in recent times.

From criticisms voiced in many parts of the country it appears to be not widely known that the ability to fly low forms an essential part of the skill of a combat pilot, and that practice in low flying is thus a very necessary part of R.A.F. training. The R.A.F. must at all times be prepared for war, and its pilots must therefore acquire their skill in peace time.

There are several reasons why training in low flying is necessary. A fundamental one is that R.A.F. pilots must be able to navigate their aircraft accurately at low altitudes in bad weather and without employing external navigation aids. Service aircraft must be capable of flying in weather which would "ground" civil aircraft, and at times when normal navigation aids may be unavailable because of enemy action.

During war operations, low flying may afford partial immunity from anti-aircraft fire. It also renders more difficult the visual and radar detection of aircraft, thus achieving tactical surprise. Pilots must gain experience in identifying, photographing and attacking targets of various types at low levels, flying by methods which make use of cover afforded by hills, valleys and woods. Such attacks cannot be simulated over the sea.

Enemy aircraft, too, may be expected to make low-flying sorties for the same reasons, and Fighter Command pilots must, by regular practice, maintain their skill in the interception of low-flying raiders. This calls for a technique very different from that of high-altitude interception and must be practised at low levels.

Inevitably this essential low-flying training causes some disturbance to the public; but it is unavoidable if we are to have an efficient air force, capable of defending Britain in war. Efforts are made to restrict the inconvenience by selecting as far as possible thinly-populated districts for use as authorized low-flying areas, but there are few large tracts of uninhabited country within suitable reach of the airfields. More than half of Great Britain and Northern Ireland is in any case unsuitable for low-flying training owing to difficult terrain and densely populated straggling areas, or because of restrictions imposed for the safety of civil aircraft. Thus many of the authorized areas do include towns and villages. Pilots are instructed to avoid flying low over such built-up localities within the low-flying areas, but during a low-flying interception exercise, for example, it may be difficult for pilots flying at nearly 600 m.p.h. to alter course in time to avoid passing over a small village.

Outside the authorized areas, R.A.F. aircraft may be required to fly low during local exercises with the Army or the Royal Observer Corps, and during general air defence exercises. Steps are taken to inform the public when such exercises are likely to involve low flying. On other occasions aircraft may legitimately fly low because of bad weather or other emergency.

A Note on the Visit of The Duke of Edinburgh to Cranwell on Tuesday, 28th July, 1953

His Royal Highness The Duke of Edinburgh was the Reviewing Officer at the passing-out parade of the fifty-ninth entry of general duties flight cadets and the tenth entry of equipment and secretarial flight cadets held at the Royal Air Force College, Cranwell, on 28th July last. The day itself, despite a forecast of bright periods with showers, proved warm if graced only by a fitful sun. The parade, which was witnessed by more than 2,500 guests and spectators, followed a now traditional pattern and was marked by the smartness of all taking part. His Royal Highness presented the Sword of Honour to Flight Cadet Under Officer P. G. Cock, the Queen's Medal to Flight Cadet Under Officer J. M. Henderson, and the Medal of Honour to Flight Cadet Under Officer N. A. Parker.

In his address to the cadets, His Royal Highness said that there was no reason why officers of the Services should not take an interest in the industrial, commercial and economic affairs of their country and of the world. It was important for them to see the defence organization as part of the larger picture of national and international conditions. He reminded the cadets that, while strict discipline was vitally necessary if they were to become members of a fighting team, no Service wanted mere automatons as officers. They were required only as individuals. His Royal Highness was at pains to stress the need for all three Services to wield national weapons as a team.

After the parade the Duke of Edinburgh planted a tree in commemoration of his visit and then inspected the parade of the Flying Wing. Luncheon for the Royal party was held in the College. In the afternoon His Royal Highness joined the new senior flight cadets outside the College to watch an impressive flying display by Meteors of No. 203 A.F.S., led by a post-war Old Cranwellian.

The Duke of Edinburgh arrived and departed by air and was himself at the controls of his aircraft on both occasions.

U.S.A.F. Enter For Britannia Shield Competition

The United States Air Force is to enter a team to compete in the Britannia Shield competition which will be held in London from 6th to 12th November. Their team will be drawn mainly from U.S.A.F. units in this country, but will also include a number of athletes from bases in Germany.

The competition this year will embrace boxing, shooting, swimming and fencing, for which, in addition to the R.A.F., present holders of the Britannia Shield, teams from Belgium, the Netherlands, Norway, the United States Forces in Europe, and the Royal Canadian Air Force in Europe have entered.

R.A.F. Washington Aircraft to Return to United States

As Canberra aircraft are now coming steadily into service in Bomber Command, the R.A.F. are now returning to the United States the Washington (B-29) medium bombers which have for the past three years been in service in squadrons of Bomber Command. This process will be completed in the next fifteen months.

The Washington aircraft, which were first delivered here in March, 1950, have provided an invaluable temporary supplement to British Bomber Command.

New R.A.F. School in Malta

Nearly 250 children of Service families stationed in Malta, two-thirds of them R.A.F., now study in a fine new R.A.F. school recently formally opened at R.A.F. Station, Luqa.

Constructed of sandy limestone quarried on the island, the building was officially opened with a silver key by Mrs. Reynolds, wife of Air Vice-Marshal B. V. Reynolds, C.B.E., Air Officer Commanding, Malta.

Its several special features include airy verandas, tiled floors, sliding glass windows and doors on each side of the class-rooms, electric fans, heaters, and strip-lighting. The rooms include an assembly hall, nine class-rooms, a headmaster's room, and general-purpose, medical inspection, and staff rooms.

"New Look" for R.A.F. Far East Kitchens

Airmen's kitchens at Far East Air Force stations are taking on a "new look." Wood and charcoal-fed stoves and boilers are disappearing, giving way to electric equipment in various forms of ovens, boilers, steamers, grillers, fryers and hot-plates, to ensure that airmen and airwomen are served three square, well-cooked meals daily, and that food reaches the last-comer just as piping hot as that for the earliest arrival at meal times.

Local fruits, including bananas, pineapples and pomelos, are often served, and such native dishes as Nasigoring (a Malay dish of fried rice with chopped ham, eggs and prawns, with spices to taste, which has to be somewhat modified to suit European palates) and Mah Mee (a Chinese dish similar to Nasigoring with spaghetti replacing fried rice) are very popular.

Gone are the days of "spud bashing" fatigues. Electric potato-peelers deal with some 56 lb. of potatoes in five minutes. Electric bread-cutting, mixing, mincing and potato-chipping machines have been installed to speed up meal production (they also, of course, eliminate the cut finger hazards of the old-fashioned kitchen), and the electric plate-washing machine washes and dries 6,000 plates an hour.

* * *

ITEMS FROM AMERICAN SOURCES

Aircraft

In connection with the latest series of atomic tests, some U.S.A.F. aircraft capable of carrying nuclear devices were displayed at Indian Spring Air Force base, Nevada. They included a North American B-45 Tornado, Convair B-36, Boeing B-47 Stratojet, Republic F-84G Thunderjet and Boeing B-50 Superfortress. With assistance from jet stream winds at altitude a Stratojet attained ground speed of 794 m.p.h. several weeks ago.

Ground Observer Corps

Volunteers are coming in at the rate of two to three thousand new members per week. Current membership is 265,000, but the aim is to bring this up to [illegible]0,000 as soon as possible.

New U.S.A.F. Device for Taking Night Aerial Photographs

A new device for providing an intense continuous light source for taking night aerial photographs is being developed for the United States Air Force by a group of scientists and engineers at Wesleyan University.

Called the "Hell Roarer," the device enables the taking of night aerial photographs by means of special cameras. The name, given to this mechanism by the Wesleyan group, originated from the roar emitted when in operation.

The mechanism, contained in a torpedo-like 12 ft. cylinder, attaches to the wing of a reconnaissance aircraft and is controlled by the pilot. Built-in warning signals indicate if anything is wrong, and the entire mechanism can be jettisoned if the plane is endangered. The fuel for the "Hell Roarer" is atomized, or finely pulverized, magnesium powder, which burns at an extremely high temperature and must be handled with extreme care. It puts out an intense light of approximately 10,000,000 candlepower and will burn for more than four minutes. The pilot can turn the "Hell Roarer" on and off as required.

Expedition to Discover Source of Arctic Ice Islands

The first phase of a joint United States-Canadian programme to investigate the most probable source of Arctic ice islands is now under way with the departure of two Canadian scientists for the Ellesmere Ice Shelf, a sheet of ice approximately 10-15 miles wide and 100-200 feet thick fringing most of the north-west coast of Ellesmere Island.

The expedition will compare the physical features of the Ellesmere Ice Shelf with those of famous T-3 Fletcher's Island, the floating Arctic ice island near the North Pole where the U.S. Air Force has its northernmost weather and geophysics research stations. This comparison is being made to determine if the ice islands originate from the ice shelf.

Industry Advisory Committee on Supersonic Cooling

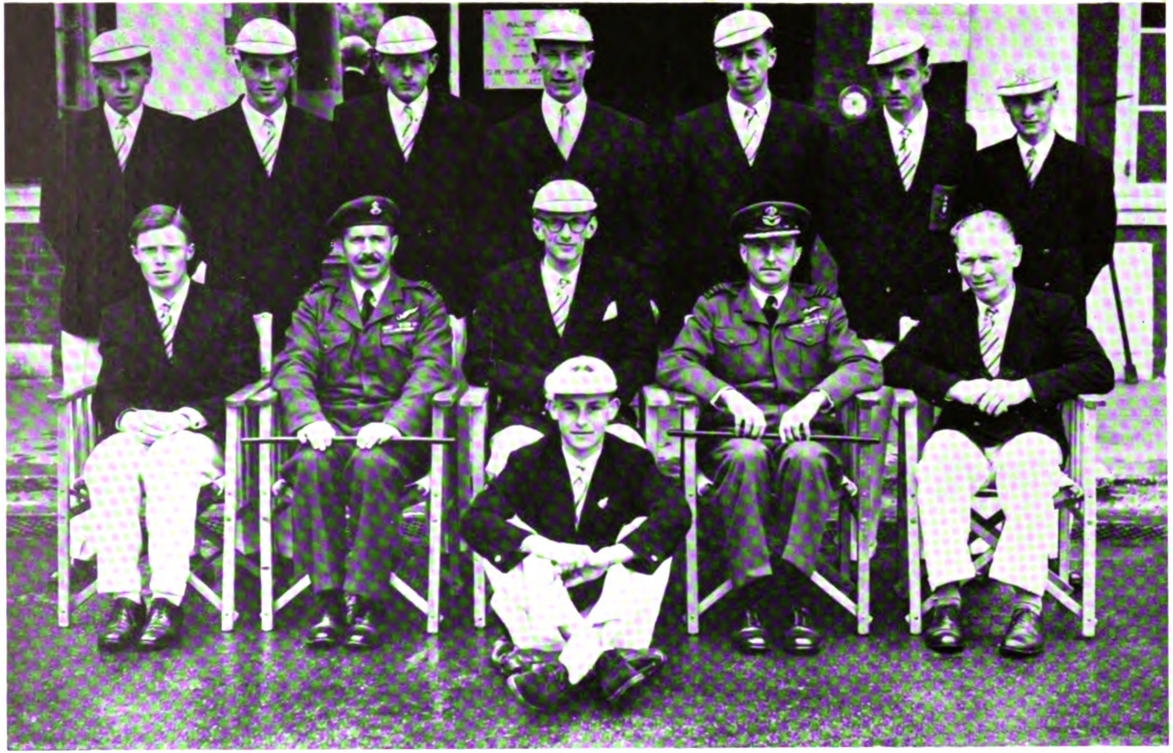
An Industry Advisory Committee on equipment cooling systems has been formed to assist the U.S. Air Force in overcoming the problem of extremely high temperatures encountered by supersonic aircraft and missiles.

With the shattering of the sonic barrier by aircraft and missiles another problem arose. Immediately beyond the speed of sound in our atmosphere lies a temperature barrier, which is created by aerodynamic heating. This heating is caused by the temperature rise of the air near the surface of a high-speed vehicle, a result of skin friction between the exterior surface of the vehicle and the air.

The temperature barrier is not a well-defined speed region, as is the sound barrier, but it is an ever-increasing barrier to higher flight speeds. The temperature rise, for example, with an aircraft flying at 1,000 m.p.h. would be 230° F. and 800° F. at 2,000 m.p.h., with the internal equipment having a corresponding temperature rise.

"The Air Forces Quarterly" in U.S.A.

The staff of the Air University Library, Maxwell Air Force Base, has indexed a number of aeronautical and military periodicals, not indexed elsewhere, as a bibliographic service in support of the instructional and research programmes of the Air University. It is of interest to note that AIR POWER (The Air Forces Quarterly) has been included in this useful index service.



[Photo by Howard Evans, Wallingford-on-Thames and "Reading Mercury"

Back Row (L. to R.); L.A.C. P. Cranmer (Bow), S.A.C. G. I. Arber, L.A.C. K. Cross, P./O. C. Davidge, Cpl. G. O. Green, Cpl. E. A. Field, Cpl. L. Savory (Sub. Cox).

Front Row; A.C. G. Sorrell, Wing Commander C. T. Kimber (Vice-Chairman and Crew Manager of R.A.F.R.C.), F./O. C. F. Porter (Captain of Boats), Group Captain A. G. Dudgeon (Station Commander, R.A.F. Benson), S.A.C. J. W. Johnson (Stroke).

Front Centre; S.A.C. L. M. Staal (Cox).

THE ROYAL AIR FORCE SPORTS NEWS

ROYAL AIR FORCE ROWING

By Wing Commander C. T. Kimber, D.F.C.,
Vice-Chairman and Crew Manager R.A.F. Rowing Club

WHEN I was given the honour of becoming vice-chairman of the Royal Air Force Rowing Club my first term of reference was clearly laid down as "To further rowing throughout the Royal Air Force" and to place rowing firmly on the Royal Air Force map. How to achieve this? At Benson there was a very small band of enthusiasts. Within that small band I could see a small but none the less firm nucleus on which to build. The Benson Club had already embarked on training in the American Conibear style, which was enthusiastically supported by Flying Officer C. Porter. At the outset I was frankly suspicious of this style. One thing, however, could not be ignored, and that this style for many years had won many of the major international events for the American crews. Consequently I became a convert but there was a fair amount of scepticism and raising of eyebrows up and down the river, but we persevered. Above all, we were firm in making our first requirement a solid foundation of physical fitness; that in the end must be the criteria of success should this come our way.

Early this year it was decided to reconstitute the Royal Air Force Rowing Association, later Rowing Club, and in my capacity as vice-chairman, along with that of chairman of the Benson Club, I began to rough out a plan for the season. About late February I was confident that the Eight would reach the Thames Cup standard for Henley with something to spare. At no time were there more than ten men to make the final selection for the Eight, and with Porter chivvying the crew day and night, without a break, the training programme went ahead. The men sacrificed leave, week-ends, girl friends and all the normal entertainment which young chaps expect. Training was hard—it had to be. The Thames Cup was the goal and with it I hoped we would break the too-long run of successes of American crews who for years had been taking the Thames Cup back to America.

The first major event for the Eight was at Reading for the Head of the River. We were still ragged with the Conibear style but definite progress had been made. Thanks to Tom Bolles of Harvard University we had received an excellent colour film of the Harvard 1947 Eight in training, and this had been viewed by the crew night after night along with films of themselves. However, to come back to Reading. There were many more eyebrows raised but we came third, being beaten into first place in two seconds.

By now I was confident of two things. I could see the Wyfold Cup within our grasp and the Thames Cup not too far away. I should emphasize here, however, that although this Eight were to become the R.A.F. Eight, at Reading they rowed as R.A.F. Benson. At this stage I wanted to be absolutely certain that whenever the R.A.F. was entered I would meet my first term of reference and at the same time row within the class of rowing.

Shortly afterwards the same crew entered for the Tideway Head of the River, Putney to Mortlake, at which they started at 217th from approximately 260 crews competing, and finished twenty-second. This was an all-time record but I was still not satisfied that we had reached R.A.F. status.

By this time my plan was beginning to formulate more clearly and I could see that by using the Benson Club as a "nursery" the crews for final selection for the Royal Air Force crews would not present any difficulty. Accordingly the Benson crews carried on with the provincial regattas at which they had considerable success, including winning the coveted Vale of Evesham Trophy, and in all winning seven trophies in two months.

Royal Air Force crews proper appeared for the first time in late May when they won the Junior/Senior Fours and the Senior Fours at Chiswick. Our real test, however, was to come in the Reading Regatta in June, which is considered as a rehearsal for Henley in so far as British crews are concerned. Here we won the Thames Cup Trial Eights and the Senior Fours. Apart from foreign competition I considered the way was clear for Henley. The time had come to take stock. The R.A.F. had little in the way of equipment for first-class rowing; I wanted a new Shell Eight very badly and there was not much cash available. We had no income and were relying almost entirely on support from Commands. The generosity of Headquarters Flying Training Command through the interest of Air Commodore A. P. Bett did much to help. At this stage I told the Air Commodore that if I could find the money for a second-hand Eight, which was on offer, the Royal Air Force had better than an even chance of retaining the Thames Cup in this country. Forthwith the Air Commodore impressed this upon the Commander-in-Chief, H.Q., F.T.C., and by return I received a cheque for £100. Other contributions came and I obtained the boat.

For the three weeks before Henley opened the crew went into hard training; no harder than what they were accustomed to, but the objectives were now the Thames Cup and the Wyfold Cup, which brought the added urge to train well and do well.

We had long decided that the crew of four for the Wyfold would be found from the Thames Cup Eight. This caused considerable comment from the pundits but the foundation we had laid was to bring us through. It meant, of course, that the Four had to row the course ten times in four days, including a semi-final and final for the Thames Cup and a final for the Wyfold in five and a half hours on the finals day.

The Wyfold Four broke all records on two occasions on the Friday, but probably the most exciting race which will live long in Henley's history was the race against Princeton University of America for the semi-final of the Thames Cup.

By this time I was wondering whether I was expecting too much from the crews. The pace for this race and the two to follow I knew would be killing. What to do? To withdraw from one event and make certain of the second, or go for both. I talked it over with the Captain of Boats, Flying Officer C. F. Porter, and we decided to go for both. As I saw it, if we could beat Princeton in the semi-final the rest of the day was ours. I had in mind also the 1,250 river miles the crews had rowed during the previous six months' training; here was the criteria.

As I went down in the Umpire's launch for the start of this race I had mixed feelings. This had become something outside the R.A.F. I could sense and feel the tremendous hush and excitement before the race started. Although the semi-final, the race had taken on an importance of international significance. If

Princeton beat the Royal Air Force it may well be that they would win the final. If the R.A.F. beat Princeton the Thames Cup would remain in Great Britain since it would be an all-British final. Therefore at this stage the crowd at Henley were expecting everything from the R.A.F.

I have never witnessed a Henley as I did for this race. On the Berks side of the river the crowd was lined six to eight deep from the start to the enclosures. Immediately after the start tension was relaxed and although my attention was fixed on the R.A.F. crew I was aware of the dull roar of voices within which could be heard: "R.A.F. . . . R.A.F." This roar was passed down the bank as the boats drew level with the crowd, until with the R.A.F. considerably in the lead about a quarter of a mile from the finish the roar swelled into a crescendo. But it was yet too early.

I knew the Americans had trained for fast finishing, and here they started to increase their rate. But the R.A.F. held on. Meanwhile the roar rose to something which has never been heard at Henley before and the R.A.F. won by one-third of a length. Come what may in the future that race will live long in the memory of those who saw it, for not only the R.A.F. but British rowing and the retention of the Thames Cup at home was the stake.

At 1500 hrs. the Eight were on the water again for the final of the Thames Cup, and at 1730 hrs. four of the Eight appeared in the Wyfold final. There have been ample Press reports on these races; sufficient to add that both crews timed their races brilliantly and the criteria was proved correct.

No one could have been better supported by these crews. We, I know, are not given to exaggerated statements, but if my enthusiasm allows me to say that they were magnificent everyone I feel sure will understand.

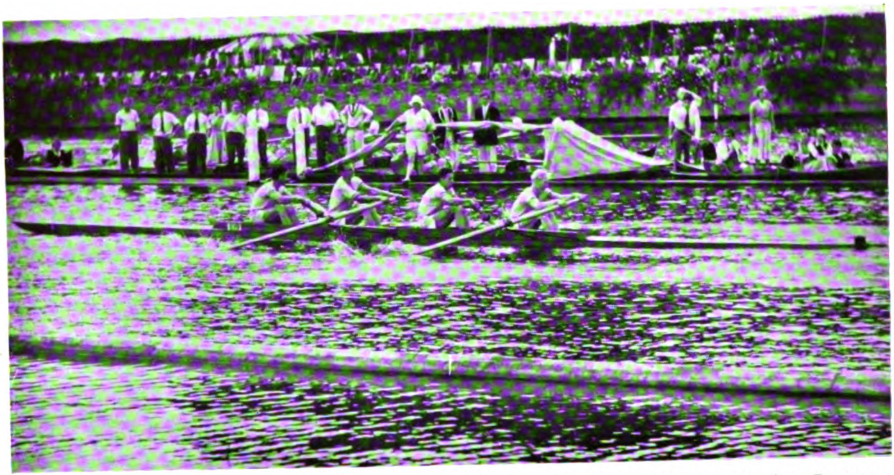
Royal Air Force crews have appeared in nine major events this season to date and have won seven, including the Senior Sculls at Marlow Regatta by Aircraftman S. Rand, who, as I write this, is entered for Wingfields and the London Cup.

It will be of interest to note that of the eight crew members six are National Service men and one officer only is in the crew. There are no well-known oarsmen in the crew, although full recognition has been made and each one, for the first time I believe in Service history, has been awarded the R.A.F. rowing "Blue."

What of the future? It seems that we can now consolidate, build up and spread rowing throughout the Service. There is much to be done and I hope there will be no lack of officers and airmen at other stations to organize their rowing. It requires considerable personal sacrifices, but that comes easy if the enthusiasm is there. It requires financial support, and if rowing is worth while this should be forthcoming. This is just a beginning and already our plans are being laid for next year. So far as we are concerned there is no close season for rowing, and training for next season will commence in October of this year. With the support and encouragement of Commands and other formations rowing can be placed firmly on the Royal Air Force map and it can be made to stay there.

During this coming autumn we hope to open the first Royal Air Force Club and Boathouse in Wallingford, which will become the Headquarters of Royal Air Force rowing. Practically all the work is being done by the same nucleus referred to earlier on a self-help basis, and it is even more creditable for them since the majority are National Service men, who will not see the fruits of their labours whilst in the Service.

On the Thursday following Henley the crews and myself were honoured by an



The R.A.F. coxwainless four, which won the Wyford Challenge Cup at Henley Regatta, July, 1953, and represented Great Britain in the European Rowing Championships at Copenhagen in August, 1953.

[*Air Ministry Photo*

On left Wing Commander C. T. Kimber, D.F.C.; in lounge suit second from right, Group Captain L. J. Stickley, O.B.E., D.F.C. (Chairman, R.A.F. R.C.). In blue blazers The R.A.F. VIII. L.A.C. P. Cranmer (bow); Cpl. G. O. Green; L.A.C. E. A. Field; S.A.C. J. W. Johnson (stroke); L.A.C. K. Cross; A.C. G. Sorrell; S.A.C. G. I. Arber; S.A.C. L. M. Staal (cox). Flying Officer C. F. Porter, B.Sc. (captain of boats) and Pilot Officer C. Davidge.

invitation to Whitehall to meet the Air Council, the Secretary of State and Lord Trenchard. What greater reward could we have asked when Lord Trenchard was heard to say "This is one of the greatest things that has happened to the Royal Air Force since the Battle of Britain."

Aircraftman S. Rand, who won the Senior Sculls at Marlow Regatta, ranks now as No. 2 Sculler in Great Britain after coming in second in the Wingfield Sculls at Henley, being beaten to first place by Tony Fox, the No. 1 British Sculler.

Following on Henley came the news that the Royal Air Force coxwainless four, which had won the Wyfold Challenge Cup there, had been selected by the A.R.A. selection committee to represent Great Britain in the European Rowing Championships at Copenhagen on 13th-16th August.

Stroked by G. Sorrell, who two years ago was at St. Paul's School, they were captained by Flying Officer C. F. Porter from two, the only officer in the crew. E. A. Field steered from bow and J. O. Green was at three. In both heat and final they were impressive, beating Yugoslavia, the Olympic Champions of 1952, who used the very same crew. Over most of the course they were a close second to Denmark, but the finishing pace took its toll and the Denmark crew drew ahead to win and the R.A.F. crew were just beaten into third place by the Norway boat.

These R.A.F. National Service airmen, with no rowing background before this year's Henley, took on eleven Continental champions for Britain with no Stewards class experience and to have gained third place was a most creditable effort.

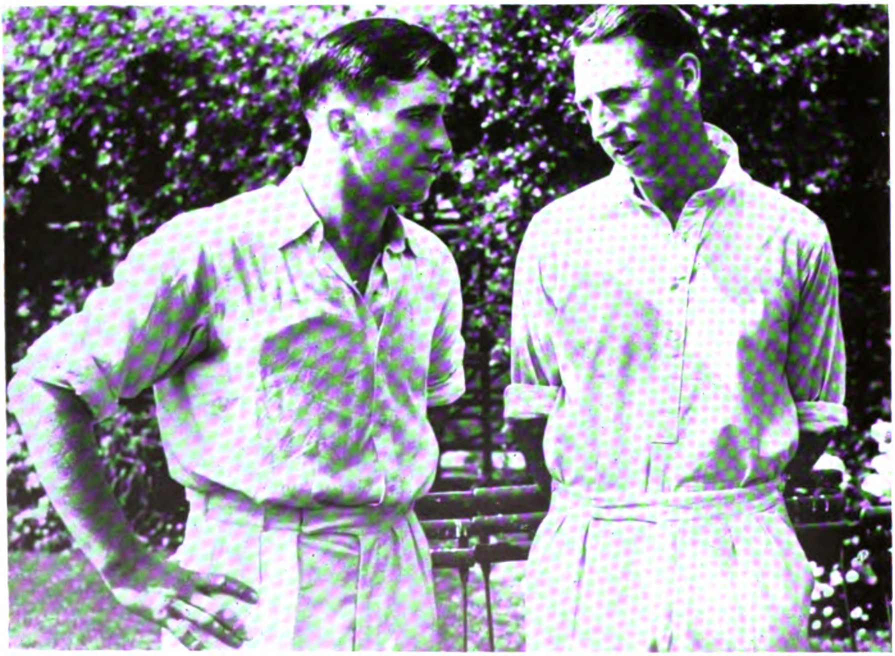
The progress of the Royal Air Force crews during the 1953 season is as follows:

Junior/Senior Fours. Chiswick. Won.
Senior Fours. Chiswick. Won.
Senior Fours. Reading. Won.
Thames Cup Trial Eight. Reading. Won.
Senior Sculls. Marlow. Won.
Thames Cup. Royal Henley. Won.
Wyfold Cup. Royal Henley. Won.

SPORTS NEWS FOR JANUARY, 1954, NUMBER

The pages of this Journal offer an excellent opportunity for stimulating interest in every branch of sport. Articles for the next number (January, 1954) should be sent to reach the Editor not later than 1st November, 1953. Winter sports articles would be particularly appropriate.

CRICKET: ROYAL NAVY v. THE ROYAL AIR FORCE AT LORD'S, FIRST DAY
L.A.C. F. S. Trueman gets his first wicket, Instructor Lieutenant G. G. Tordoff, R.N., for 19.



[*Photos: Sport and General*

CRICKET: R.A.F. v. THE ROYAL NAVY AT LORD'S, FIRST DAY
F. S. Trueman (R.A.F.), who played for England in the Final Test Match at the Oval, chats with his captain, Squadron Leader A. C. Shirreff, during the luncheon interval.

CRICKET IN THE ROYAL AIR FORCE

By Squadron Leader L. H. Clint, R.A.F.

THE EFFECTS OF NATIONAL SERVICE

THERE is a school of thought—and it is by no means confined to the Royal Air Force, but exists also in both the Army and the Navy—which strongly deplores the fact that Service representative sides are no longer composed entirely of Regular officers and men. There is, of course, considerable justification for the view that, to permanent officers and to men serving on long-term engagements, it means much more to be chosen to represent their Service than it can ever mean to a National Service youngster, whose brief occupation of the coveted place is likely to become merely a fleeting incident in a full playing career.

Examined on purely sentimental grounds the case for the Regular is overwhelming, but before arriving at any conclusion we must first of all consider the effect which the presence of young professionals has had and is having on the development of cricket in the Royal Air Force.

First of all I think it fair to mention that any prejudice which might have existed against National Service personnel has long since disappeared and they now, in general, merit our high regard. The Service has come to depend upon them in countless ways and there is no doubt that their ranks contain top-class material, only a proportion of which would normally come to us through the medium of Regular engagements. As they are pulling their weight so well it is the Government's wish that they should be given a fair chance with the Regular to share the advantages merited by their efforts.

Apart from this, however, the presence of numbers of young professional cricketers scattered amongst the Royal Air Force stations is doing much to raise the standard of play in the Service. These youngsters play, talk, think and dream cricket. Their association with county players and, in particular, with county coaches, enables them readily to convey cricket wrinkles and worthwhile advice to other players on their stations. The standard of play in the inter-station cricket cup competitions is showing steady improvement and the commands at home can now produce sides almost, if not quite, of minor counties standard. The Regular must, and in fact does, reap the benefit in the development of his game.

The effect on the Royal Air Force Representative XI has, of course, been tremendous and the team now has a full county look. Up to 1952 only the Combined Services XI was considered strong enough to play first-class matches (three days) against county sides, but during the current season the Royal Air Force have embarked, single handed, on such matches and have put up a remarkably good show.

Opening the season against the strong Northants XI, led by Mr. F. R. Brown, the Royal Air Force lost by 132 runs, but even so succeeded in scoring a total of nearly 500 runs against their redoubtable opponents. Subsequently the XI visited Taunton, where they beat Somerset by seven wickets and then defeated a Pakistan XI, containing several Test players, by 119 runs. More recently the XI have been to Trent Bridge, where they gained an exciting victory over Notts by three wickets, winning on the third ball of the last over after being set to get 159 runs in an hour and a half.

The Royal Air Force is undoubtedly very fortunate in having, as captain of the XI, Squadron Leader A. C. Shirreff, an all-rounder of considerable experience, who gained a Blue at Cambridge whilst still a freshman, and who now plays for Kent whenever his Service duties permit. Shirreff has unquestionably been the mainstay of Royal Air Force cricket since the war, and many young professionals now making names for themselves with their county sides owe him a deep debt of gratitude for the many ways in which he has helped to bring them on, particularly from the tactical point of view, whilst they have played under his captaincy.

Other members of the XI this year include Squadron Leader R. G. Wilson, a former captain of the Combined Services XI, who has had several good innings this season including 57 (run out) and 102 in the match against Northants, Flying Officer M. D. Fenner, the wicket-keeper, who keeps for Kent when Godfrey Evans is away, and Flight Lieutenant R. Leggett, a hard-hitting bat and brilliant field who has a Norfolk qualification. These, together with the Reverend W. E. G. Payton, another Cambridge Blue with Notts associations but who is qualified for Derbyshire, constitute the Regular element in the Representative XI.

Prominent amongst the young professionals is, of course, Aircraftman F. S. Trueman, whose seeming loss of form this season has caused him to be the centre of so much controversy. It is not generally realized that Trueman has suffered from considerable trouble with his ankles, but now that this appears to be over, there is every reason to believe that he will regain the form which carried him to a regular place in the England XI last season.

Other players who seem assured of regular places in their county XI's when they leave the Service are Aircraftman R. G. Thompson (Warwickshire), Aircraftman J. S. Pressdee, of Glamorgan, and Aircraftman M. J. Horton, of Worcestershire. It may be of interest to recall that in the last two seasons five members of the Representative XI have been released from the Service and are already becoming well known in county cricket. They are Alan Moss and F. J. Titmus (Middlesex), Jim Parks (Sussex) and R. Illingworth (Yorkshire). The fifth, David Heath, is playing as an amateur and appears from time to time in the Warwickshire XI.

The great objective of the Representative XI has been undoubtedly to win outright the Inter-Service Cricket Championship. Last year it was shared after a drawn game with the Army, both sides having previously beaten the Navy. With the present strength of the Service sides it is, perhaps, unfortunate that only two days are allotted for these matches because unless helped by the wicket or freak declarations, the sides are usually too good to be got out twice in two days. I feel, and I am now expressing only a personal view, that if the present trend continues the Service Committees will have to consider, very seriously, the desirability of adding the extra day.

It will be seen, then, that cricket in the Royal Air Force seems to be going from strength to strength. This season no fewer than 159 stations in the United Kingdom became affiliated to the Association and took part in the two inter-station competitions. As a further incentive, the Association has been greatly honoured by the fact that Her Majesty The Queen, in her Coronation year, has graciously consented to become its patron. The President is, of course, the Chief of the Air Staff, Air Chief Marshal Sir William F. Dickson, G.C.B., K.B.E., D.S.O., A.F.C., and with a very active Committee, headed by the Chairman of the Association, the Reverend F. W. Cocks, M.A., the prospects for the future seem very bright indeed.

In the Inter-Services match at Lord's in August, the Royal Air Force had an easy victory against the Royal Navy; during which Trueman took six wickets for 47 runs. His match record of 10 for 112 was better than the figures represented, for at least 20 runs were scored at his expense by means of fortunate snicks behind the wicket. His selection to play for England in the final Test Match against the Australians and the manner in which he amply justified this selection, has already been well written up in the national Press. That a member of the Royal Air Force played so prominent a part in our great victory will undoubtedly stimulate greatly the interest in cricket throughout the Royal Air Force.

ROYAL AIR FORCE BADMINTON ASSOCIATION

By Squadron Leader C. J. Landrey

WHEN the Royal Air Force Badminton Association started life in September, 1947, only forty-five stations were affiliated. Last season some 106 stations had joined in and it is hoped even more will come along in 1953-4.

The standard of badminton in the Royal Air Force has steadily improved during the years, and last season Corporal J. Shaw was again selected to represent England (he had previously played three times for his country), and six men regularly played for counties. Some players improved to such an extent whilst in the R.A.F. that they are playing for their counties or regions after demobilization.

For the coming season it is hoped to run the following events:

(*a*) Inter-Station Knock-out Competition for men, plus a "B" competition for those stations unsuccessful in preliminary rounds.

(*b*) Inter-Station Knock-out Competition for women.

(*c*) Individual championships at R.A.F. St. Athan, where a welcome is extended to all players, good or not so good. (At the individual Championships in the 1947-8 season about 100 competitors took part, whereas last year 287 entry forms were received.)

(*d*) Inter-Command Competitions. A knock-out will be organized for the men, and an American-type tournament for the women.

(*e*) Matches by both first and second R.A.F. teams against county teams, with possibly an "international" match against Scotland and/or Wales, and matches for the W.R.A.F. team.

(*f*) A tour abroad. Last season the W.R.A.F. sent an all-conquering team to Germany. It is hoped that this season the R.A.F. will go to Denmark as guests of a Copenhagen club to oppose the Danish Services, amongst others.

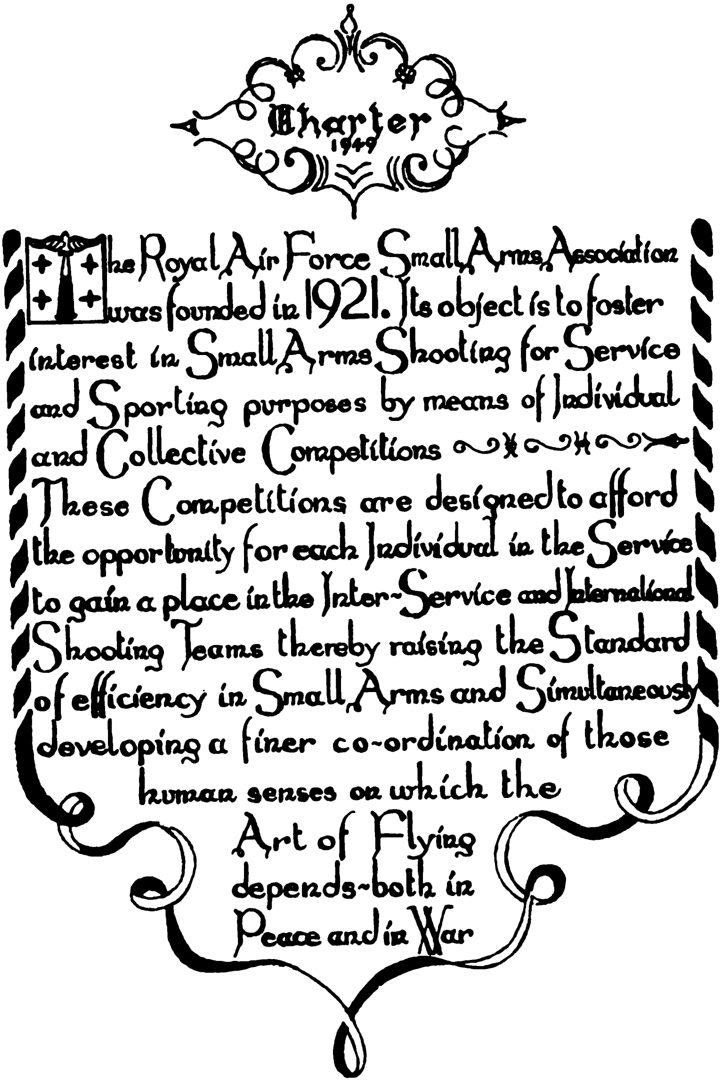
The W.R.A.F. play annual inter-Service fixtures and have so far won the event five times out of six. It is to be regretted that the Army and Royal Navy do not see fit to establish men's associations, as this deprives the men of the Royal Air Force from getting together with their counterparts in the other services. However perhaps the sight of R.A.F. names in internationals may stir them to copy our example.

It is estimated that well over 10,000 personnel in the Service, at home, are playing badminton regularly, and it is a sport which is rapidly regaining, if it has not already surpassed, its pre-war popularity outside as well as in the Royal Air Force.

Why not try it? Give your name to your Physical Fitness Officer today.

ROYAL AIR FORCE SMALL ARMS ASSOCIATION

By Wing Commander H. R. Patterson, O.B.E., R.A.F.



Charter
1949

The Royal Air Force Small Arms Association was founded in 1921. Its object is to foster interest in Small Arms Shooting for Service and Sporting purposes by means of Individual and Collective Competitions

These Competitions are designed to afford the opportunity for each Individual in the Service to gain a place in the Inter-Service and International Shooting Teams thereby raising the Standard of efficiency in Small Arms and Simultaneously developing a finer co-ordination of those human senses on which the Art of Flying depends-both in Peace and in War

Thus was the object of the Royal Air Force Small Arms Association defined in the Charter signed by Marshal of the Royal Air Force The Lord Tedder, G.C.B., D.C.L., LL.D., in 1949. That the aim has been (literally) well maintained is manifest from the results of the 1953 meeting.

The 27th R.A.F. Championship meeting, attended by about 1,500 competitors, was concluded on Friday, 19th June, when the prizes were presented by Air Chief Marshal Sir William F. Dickson, G.C.B., K.B.E., D.S.O., A.F.C., Chief of the Air Staff. Before this ceremony, however, the President of the R.A.F.S.A.A., Air Marshal Sir Ronald Ivelaw-Chapman, K.C.B., K.B.E., D.F.C., A.F.C., made the very important announcement that Her Majesty The Queen had been graciously pleased to make an annual award of a medal, to be known as the Queen's Medal, to the champion shot of the Royal Air Force. Similar medals were to be awarded to the champion shots of the R.C.A.F., the R.A.A.F. and the R.N.Z.A.F. He welcomed members of the Commonwealth Air Forces who had been shooting in individual events and who were to shoot as a combined team against the R.A.F. on the following day. The President complimented the competitors on the high standard of their shooting, and he was particularly pleased to see such encouraging scores by young newcomers to the meeting.

[Crown Copyright

The Queen's Medal for Champion Shots of the Air Forces. The reverse side which represents Hermes throwing a javelin and mounted on a hawk in flight

During the afternoon the Chairman, Group Captain G. E. Watt, C.B.E., A.F.C., presented a memento to Air Vice-Marshal F. C. Halahan, C.M.G., C.B.E., D.S.O., M.V.O. (ret.), in appreciation of his services to the Royal Air Force Small Arms Association, of which he was co-founder and chairman for twenty-one years. The winner of the Service Rifle Championship and the Queen's Medal, Senior Technician J. E. P. Witts was "chaired" and played off the range by the R.A.F. Central Band—an innovation which will undoubtedly become traditional.

The extent to which the Royal Air Force was successful in the Inter-Service Competition at the National Rifle Association Meeting held in July is indicated in the following results:

[Photo: Gale & Polden Ltd. Aldershot

CHAIRING THE WINNER

United Service Challenge Cup, S.R.(a). Team of eight.—Won by R.A.F., score 1,346.

Whitehead Challenge Cup. Revolver. Team of eight.—Won by R.A.F., score 704. Ninth successive win.

Inter-Service XX Match. S.R.(b). Team of twenty.—Won by Territorial Army, score 2,738; 2nd, R.A.F., score 2,685.

Burdwan Challenge Cup. Aggregate of the three Inter-Service team events.—Won by the R.A.F., score 4,735; second, Regular Army, 4,696.

Squadron Leader C. C. Willott, O.B.E., had the distinction of winning Her Majesty Queen Mary's prize, S.R.(a), with an all-time record score of 184 and in addition secured the Service Rifle Aggregate, S.R.(a), and the Revolver Gold Badge.

ATHLETICS

By Flight Lieutenant J. V. Powell

(Hon. Secretary R.A.F.A.A.)

THE number of stations now affiliated to the Royal Air Force Athletic Association for 1953 exceeds all previous records. This reflects the growing interest in athletics and the wide improvement in the standard of performance in the Service. The National Service man frequently brings with him a useful experience of civilian clubs' athletics, plus an even more useful enthusiasm; the longer engagement airman invariably is "prepared to emulate" Bannister and it is the exception nowadays to find a station without its annual sports day.

By the end of June many athletes, men and women, in the Service had had their warming up competition and before mid-June had competed in station trials in readiness for the group championships arranged up and down the country. Towards the end of June most Commands had held their championships and found their representatives for the R.A.F. Championships, held as usual in early July, at the well-equipped Uxbridge Stadium.

This procedure follows the practice each year, but 1953 showed a commendable increase in the number of high-class performances. In the past there has of course been the outstanding competitors, but where there used to be one or perhaps two in any selected event, this has grown to five or six. In the days when the late Squadron Leader R. H. Thomas was winning the mile, a run in 4 min. 20 sec. would give him a comparatively easy victory; this year the R.A.F. have certainly four, if not more, milers capable of beating 4 min. 20 sec. A jump of 21 ft. would have given an athlete a championship in the thirties. Yet in the Home Command Championships at Innsworth in June, a Command not hitherto strong athletically, there were five with jumps over 20 ft. 6 in. and two of them cleared 22 ft., with Corporal Longford leaping 22 ft. 9½ in. for the victory.

The Royal Air Force misses such figures as Group Captain Finlay and Sam Ferris and even in these days they have no rivals; but the all-round ability of the R.A.F. teams for this year has been considerably better than most years gone by.

There have been several outstanding performers. A. C. Ellis, of Hillingdon, the 1952 sprints champion, retained both titles. He followed this with winning runs in the two sprints in the Inter-Services' Championships. Ellis fully deserved his selection in September for the British team against Germany and Sweden. Corporal Calladine, of Waddington, has been the "handy" man of Service and Combined Service teams. He won three titles at the R.A.F. Championships, the javelin with 178 ft., the long jump with 22 ft. 11 in. and the pole vault at 11 ft.; he cleared 12 ft. in the rain in the Inter-Service Championships to be second to Captain Anderson, the British Empire Champion, while he also won the long jump.

Corporal Ranger, of Leeming, achieved a new record in the three miles R.A.F. Championship with a splendid time of 14 min. 9.2 sec. and it was regrettable that in the three miles Inter-Services he was forced to retire half-way when running neck and neck with the ultimate winner, Signalman Norris (in the record time of 14 min. 8.6 sec.). It was the more regrettable as Ranger's retirement cost the R.A.F. the Inter-Service Championship. His running over the "country" early in 1953, when he won the Service and the Inter-Service cross-country titles earned an England International Cross-Country Cap. Sergeant Gallagher's duels with Flight Lieutenant Short over the two miles steeplechase always provide any meeting with an outstanding event. It was no exception at the Championships when the sergeant beat the flight lieutenant in the time of 10 min. 31 sec.—both beating the previous record.

With a few greying hairs, Wing Commander L. Reavell-Carter returned from the Middle East to reappear among R.A.F. title holders, in putting the shot. Sergeant McMinnis ran tenth in the Polytechnic Marathon—an excellent effort.

Sergeant Dowdeswell, of Uxbridge Hospital, was again the most prominent of the W.R.A.F. competitors and her 11.6 sec. record in the 100 yards was a great performance. She turned the tables on her rival, Captain Williamson, W.R.A.C., to secure a popular victory in the 100 yards Inter-Services. Other excellent performances were Corporal Tinsey, third in both 100 yards and 220 yards Inter-Services and the W.R.A.F. hurdlers; Corporal Napper won the R.A.F. Championship, while her rival, A.C.W. Kelly, reversed the decision and took the Inter-Services title. Both girls are very fine hurdlers.

The Inter-Command Championship was won by Technical Training Command both in the R.A.F. and W.R.A.F. In both competitions however they won with reduced points over previous years. In the R.A.F., they were first with 89 points and other Command positions were as follows: Fighter Command 66 points; Flying Training 63 points; Bomber 61 points. Lower down the scale were Maintenance 31 points; Home 29 points and Transport 17 points. Coastal obtained only one point and 90 Group did not score. The W.R.A.F. Inter-Command result was a win for Technical Training with 38 points; Home Command (with a splendid improvement over previous years) second with 32, and the remainder in the following order: Fighter 19; Bomber 15; Transport 12; Coastal 10; Flying Training 8; 90 Group 7; and Maintenance last with 6 points.

The Inter-Service Championship was a great disappointment for the Royal Air Force team: the W.R.A.F. proudly won their competition with 70 points to the 41 of the W.R.A.C. and 35 points of the W.R.N.S. The final result of the men's competition was the Army 138 points, the Royal Air Force 136 points and the Royal Navy 105 points. The result was all the more disappointing as this year the Royal Air Force was host to the other two Services. With the match at Uxbridge it would have been fitting that both R.A.F. and W.R.A.F. teams secured victory. The R.A.F. have but themselves to blame. The first string hop, step and jump man was not able to appear; Corporal Ranger unfortunately had to drop out and failed to score at least five points; while to add more fuel to the disappointment, our second string long jumper, normally quite capable of being in second place with a useful five points, failed to record a good jump with the consequent failure to score any points at all!

The best sprinters and quarter-milers were allowed to represent their civilian clubs in the A.A.A. sprints and one mile relay and it was but a weakened team which travelled to Ipswich on 27th July to take the field against the Royal Navy and the American Air Force for the "Peter's" Trophy, of which the R.A.F. were holders. It was a splendid match with an excellent afternoon's sport and no one minded the fact that the Royal Navy snatched a victory in the very last "leg" of the very last race to secure the trophy by one point, 90 points to the 89 of the Royal Air Force and the 46 points of the Americans. Outstanding in this match was the victory of a comparatively unknown R.A.F. miler, Aircraftman Yates, of Martlesham Heath, who soundly trounced Petty Officer Sharpe, the Inter-Services mile champion in 4 min. 18.9 sec., as compared with Sharpe's 4 min. 21.6 sec. Inter-Services' victory.

After two such close defeats it was refreshing that the Royal Air Force took the "Sefton Brancker" Trophy from the Middlesex County A.A.A., the holders, on 29th July in another Uxbridge competition. The R.A.F. had a lead of ten points over the county side owing to the success of the cross-country team on 11th February last. Middlesex crept up by five points as a result of the track and field match to lose the trophy by five points. The full result was R.A.F. 67 points, Middlesex 62 points and the Civil Service 52 points. Ellis failed to secure the expected sprint double being beaten in the shorter race, but Corporal Dowling, of Yatesbury, pulled out the unexpected with a fine victory in the 440 yards in 50 sec.—one of the best "quarter" wins for the R.A.F. this year. The civilian middle distance runners were too strong for the R.A.F. and L. Eyre (Civil Service) had a particularly good mile in 4 min. 15.4 sec. Corporal Longford, of West Drayton, excelled in a hop, step and jump and a long jump double, but our opponents provided the winners in the other field events.

The Association are looking forward to an equally successful cross-country season. On 12th December the Midlands Counties C.C.A.A. will be the hosts in a triangular match with the Royal Air Force and the Universities Athletic Union; this will be at Edgbaston. The five area championships of the R.A.F. will be held on 3rd February at Ruislip, Dishford, Shawbury, Cranwell and Yatesbury. The final is scheduled for 17th February at Benson. The "Sefton Brancker" match will take place at Chessington on 27th January.

The Association's annual general meeting will be held at the Air Ministry on Friday, 30th October, at 1445 hrs.

CONCERNING PERSONNEL

ROYAL AIR FORCE PROMOTIONS AND APPOINTMENTS

Among the promotions and appointments announced by the Air Ministry since the issue of July, 1953, number of this Journal are the following:

AIR MINISTRY

Air Marshal Sir Ronald Ivelaw-Chapman, K.B.E., C.B., D.F.C., A.F.C., as Vice-Chief of the Air Staff.

Air Marshal Thomas Geoffrey Pike, C.B., C.B.E., D.F.C., as Deputy Chief of the Air Staff.

Air Marshal L. F. Sinclair, C.B., C.B.E., D.S.O., as Assistant Chief of the Air Staff (Operations) in November, 1953.

Air Vice-Marshal the Earl of Bandon, C.V.O., C.B., D.S.O., as Assistant Chief of the Air Staff (Training) from October, 1953.

Air Commodore C. W. Gore, O.B.E., as Director of Mechanical Transport and Marine Craft.

Air Commodore Michael Watson, C.B., C.B.E., as Director of Signals (1) on 9th November, 1953.

Air Commodore G. H. Randle as Director of Signals (2).

COASTAL COMMAND

Air Marshal Sir John Boothman, K.B.E., C.B., D.F.C., A.F.C., as Air Officer Commanding-in-Chief with effect from the 15th November, 1953.

Air Vice-Marshal P. D. Cracroft, A.F.C., as Senior Air Staff Officer at H.Q., 15th October, 1953.

BOMBER COMMAND

Air Vice-Marshal Andrew McKee, C.B., C.B.E., D.S.O., A.F.C., as Senior Air Staff Officer.

Air Vice-Marshal Edmund Cuthbert Hudleston, C.B., C.B.E., as Air Officer Commanding No. 3 Group.

FIGHTER COMMAND

Air Vice-Marshal H. L. Patch, C.B., C.B.E., as Air Officer Commanding No. 11 Group, November, 1953.

Air Commodore T. U. C. Shirley, C.B.E., as Command Signals Officer, on 12th October, 1953.

FLYING TRAINING COMMAND

Air Vice-Marshal G. D. Harvey, C.B.E., D.F.C., as Air Officer Commanding No. 23 Group.

HOME COMMAND

Air Commodore Brian Courtenay Yarde, C.B.E., C.V.O., as Air Officer Commanding No. 62 Group.

IMPERIAL DEFENCE COLLEGE

Air Vice-Marshal T. N. McEvoy, C.B., C.B.E., as Royal Air Force Instructor.

ROYAL AIR FORCE STAFF COLLEGE (BRACKNELL)

Air Vice-Marshal Charles Edward Chilton, C.B., C.B.E., as Commandant.

SCHOOL OF LAND/AIR WARFARE

Air Vice-Marshal G. Harcourt-Smith, C.B., C.B.E., M.V.O., as Commandant, in October, 1953.

CENTRAL SIGNALS ESTABLISHMENT

Air Commodore A. M. Rodgers to take command.

S.H.A.P.E.

Air Commodore E. N. Lowe, C.B., C.B.E., as Deputy Chief of Staff (Logistics) in November, 1953.

GERMANY

Air Marshal Sir Harry Broadhurst, K.B.E., C.B., D.S.O., D.F.C., A.F.C., as Commander-in-Chief of 2nd Tactical Air Force, with effect from January, 1954.

MIDDLE EAST

Air Marshal Claude Bernard Raymond Pelly, C.B., C.B.E., M.C., as Commander-in-Chief, Middle East Royal Air Force, with effect from October, 1953.

Air Vice-Marshal G. I. L. Saye, C.B., O.B.E., A.F.C., as Air Officer in charge of Administration at H.Q., M.E.A.F., in January, 1954.

Air Commodore R. Coates as Air Officer in charge of Administration, No. 205 Group.

FAR EAST

Air Vice-Marshal Alan David Gillmore, C.B.E., as Senior Air Staff Officer.

Air Commodore V. G. A. Hatcher, O.B.E., A.F.C., as Senior Technical Staff Officer, Far East Air Force, in November, 1953.

GIBRALTAR

Air Commodore G. G. Barrett, C.B.E., as Air Officer Commanding.

RETIRING FROM THE ROYAL AIR FORCE

Air Chief Marshal Sir Robert M. Foster, K.C.B., C.B.E., D.F.C., Commander-in-Chief, 2nd Tactical Air Force, Germany.

Air Marshal Sir Alick Stevens, K.B.E., C.B., Air Officer Commanding-in-Chief, Coastal Command.

OBITUARY

It is with profound regret that, at the time of going to press, we heard of the tragic death, in a Meteor crash, of Air Vice-Marshal William Arthur Darville Brook, C.B., C.B.E., who, at the age of 52, was to have become the Vice-Chief of the Air Staff.

ROYAL AUSTRALIAN AIR FORCE

R.A.A.F., WILLIAMTOWN

MOST exhilarating and noisy of all R.A.A.F. establishments is Williamtown, near Newcastle, New South Wales. Vampires, from No. 2 (Fighter) Operational Training Unit screech overhead, their trainee pilots happily uninhibited about the noise factor, Dakotas come and go with paratroops, almost unnoticed. Even the Operational Training Unit Mustangs seem modest.

Dominating the landscape is the brightly painted paratroop training tower, unique in Australia. This and the jets give Williamtown a personality of its own.

More important, perhaps, is the Inter-Service School of Land/Air Warfare, where officers of the three Services meet for study courses and an exchange of ideas that is not possible anywhere else in Australia. While jet pilots are produced at the O.T.U., the study courses at the School of Land/Air Warfare are setting the standard for greater inter-Service co-operation and understanding than has ever been known before in Australia.

Williamtown teems with interest. The O.T.U. is staffed with young veteran jet pilots back from Korea to hand on their knowledge, the School of Land/Air Warfare brings the future generals and air marshals and, occasionally, the future admirals, together. Nearby is the paratroop dropping zone, while on the coast a lovely beach is the site for bombing and gunnery demonstrations.

The School itself is the outstanding Australian example of inter-Service integration on the personnel side. The staff is comprised of Army and Air Force (plus one Navy) officers, completely integrated into a single organization.

The Commandant is a R.A.A.F. officer, Air Commodore E. G. Knox-Knight, C.B.E., while the Assistant Commandant (and also C.O., A.M.F., Component) is an A.R.A. officer, Colonel O. W. Rennick. The Adjutant is a R.A.A.F. Flight Lieutenant, but there are two administrative officers, one for each Service. Base Services Flight, however, which runs the station under the new R.A.A.F. organization, is a purely R.A.A.F. unit, headed by Wing Commander A. E. K. Bolleman. This includes catering, defence, medical, air traffic control, equipment, radio education, barracks, N.S.T., accountant, W.R.A.A.F. and dental officers, and a chaplain.

The School of Land/Air Warfare is composed of three Wings: Air Support (divided into Offensive Support Section and Transport Support Section), Air Portability and Parachute Training. Offensive Support's Chief Instructor is Wing Commander G. H. Steege, D.S.O., D.F.C., known to many thousands of wartime R.A.A.F. types in the Western Desert and New Guinea as a fighter squadron and wing commanding officer. With him are a Lieutenant-Colonel (G. D. Solomon) and a Lieutenant-Commander (J. O. Armour, R.N.).

The Transport Support Section Chief Instructor is an Army officer, Colonel Rennick, whose Chief Airborne Operations Lecturer is a famous Scots para-

[R.A.A.F. Official Photo

At the School of Land/Air Warfare, Williamtown, N.S.W. (L. to R.). Lieut.-Commander J. O. Armour, R.N., Lieut.-Colonel G. D. Solomon, and Wing Commander G. H. Steege, D.S.O., D.F.C., Chief Instructor Offensive Support Wing.

[R.A.A.F. Official Photo

Lieut.-Colonel J. M. T. F. Churchill, D.S.O., M.C., Chief Airborne Operations lecturer at Williamtown, the School of Land/Air Warfare in Australia.

trooper on loan from the War Office, Lieutenant-Colonel J. M. T. F. Churchill, D.S.O., M.C., whose kilt adds a romantic flavour to the school.

The Chief Instructor of the Air Portability Wing is a Squadron Leader. Parachute Training Wing's Chief Instructor is Squadron Leader W. C. Keritz, whose A.R.A. officer is Major H. W. Nicholls, M.C. and Bar. Nicholls won the M.C. at Tobruk and the Bar in Korea.

The object behind the formation of the School of Land/Air Warfare is the "application of air power to land battle." As far as the objects could be stated briefly there are five:

(*a*) To teach common doctrine in air support by courses of instruction for all three Services.

(*b*) To study all matters affecting air support of armies.

(*c*) To develop and maintain a technique of parachute training in Australia.

(*d*) To train selected Service personnel of all ranks in approved methods of parachute jumping, flight control and landing.

(*e*) To train Army and R.A.A.F. officers and N.C.Os. in the theory and technique of all aspects of air portability.

The instructors are an operational group, with long experience of warfare in both the Second World War and the Korean War. They know from first-hand experience the value of inter-Service knowledge and integration.

There are two main courses apart from the paratroop courses—the senior, for colonels, group captains, lieutenant-colonels, and wing commanders; the intermediate, for the less senior officers. The senior last two weeks, the intermediate four weeks. They are Air Support Courses, in which students do an intensive period of lectures, study and exchange of personal knowledge.

The Air Portability Wing has three courses for junior Army and R.A.A.F. officers and N.C.Os.—Air Portability, Air Movement (three weeks each) and Air Despatch (two weeks).

An example of the training would be a day of the schedule for No. 3 Air Movements Course last year. Day 1: After Commandant's address and introductory periods come lectures on roles and uses of transport aircraft and history and organization of air transport. Then the students see a Dakota, watch a demonstration of loading techniques and listen to lectures again on safety precautions and cordage and knots.

Lectures, syndicate studies and exercises are split up by practical demonstrations, and lectures are enlivened by well-acted little plays—staff and students appear on a stage in costume and act scenes which would occur under conditions affected by the matter described in the lecture. Films are shown in the evening, very often such as "True Glory," "Fighting Lady" and "Berlin Airlift."

Discussion and "cross-talks" pull the students into the actual work of training, to exchange information and experience. Lectures are also followed by lengthy question periods. Every effort is made to draw the individual student into the training of other students.

The students are given first-class demonstrations of the dropping of paratroops and the parachuting of supplies and equipment. They are taken to the dropping zone some ten miles away and watch a full programme.

This correspondent watched one such demonstration which lasted about an hour, full of action! First was a demonstration of the art of pure parachuting with and without personal equipment. R.A.A.F. Dakotas from No. 86 (Transport) Wing, Richmond, made runs at three-minute intervals. First, a single drifter. Second run, a man in clean fatigues and one dummy parachutist with a

[R.A.A.F. Official Photo

Many Korean veterans are in this group of pilots of No. 2 (Fighter) Operational Training Unit of the R.A.A.F. at Williamtown, N.S.W.

goreless X-type chute. Third run, two men in clean fatigues. Fourth run, two men each with a leg kitbag—which can carry up to 60 lb. of equipment, explaining why paratroopers learn their curious gait of walking. Fifth run, two men each with a Bren valise containing Bren gun and spare barrel. Dropping height was 1,000 ft., aircraft speed 90 knots.

Next came a Mustang from No. 2 O.T.U. to lay a smoke-screen which, while impressing the audience with the effectiveness of the screen under good weather conditions, also demonstrated that the aircraft would not be a joy to fly on that low, straight course under fire.

Dakotas came over again to drop fifteen paratroops from the Airborne Platoon, A.R.A., which is stationed at the School of Land/Air Warfare. They dropped as a stock with assorted equipment. They were followed by Dakotas dropping sixteen dummies, each weighing 16 lb. from 500 feet. These dummies are known as Paragons and can have battle noise simulators attached. The object of this exercise is to create a diversion away from the dropping zone on which the actual paratroops are dropping.

Supply dropping from a Mustang was another interesting series, two Mustangs each dropping two Storpedoes from their wing bomb racks at 135 knots at 500 feet. The fifteen-inch diameter containers are suspended from twelve-inch chutes, dropping at forty-eight feet per second and fall on the nose.

Dakotas returned. One dropped ten packs, using the roller conveyor despatch system. This was most effective, as the chutes were of various colours, but apart from the colour the main importance, as stressed by the commentator who described all these demonstrations over a loudspeaker system, was that ten packs can be dropped by this method as against some five or six by hand.

Mustangs then returned, the first dropping two Storpedo containers and the second the same, but with a delay device, which makes for accuracy.

Biggest items dropped were 500 lb. concrete blocks, and a 44-gallon water drum weighing 575 lb., which were ejected from a Dakota by roller conveyor from 800 feet on the Warwick pack parachute system. Each item was suspended from a group of chutes, the pilot chutes blowing away into the bush around the dropping zone.

Students also attended demonstrations of rocketry, gunnery and bombing by Vampires and Mustangs from No. 2 O.T.U. Assembled on the sandhill overlooking a beautiful Pacific beach, they watched displays designed to impress upon them the value of tactical air support as a weapon.

Most romantic of the courses, naturally, are the paratroop courses. There is a permanent Airborne Platoon, A.R.A., at Williamtown, commanded by Lieutenant R. T. Johnston, an Australian who learned his business in the British Army's paratroops. This platoon is under constant training. Apart from the displays which it puts on weekly for the School of Land/Air Warfare students, it is prepared for employment whenever called upon by the civil power. In case of earthquake, volcanic eruption or flood, the platoon could be most useful. Courses are continuously given to A.R.A. and C.M.F. officers and other ranks, who spent a fortnight here and return to their units.

Most noticeable to this writer was the lack of "film star" attitude at the Paratroop School. Today the Army regards the parachute merely as a method of transport. The light infantryman of today, or the stormtrooper, is thrown into battle lightly armed using a parachute to get to his battleground.

If the Army could, it would train every infantryman in paratroop duties. No longer is the paratrooper a special type, for the paratrooper is like the submariner in the Navy, he is just another soldier. In fact, however, the Army take its para-

[*R.A.A.F. Official Photo*

Paratroops of the Paratroop Platoon of the Australian Regular Army at Williamtown, N.S.W.

troopers from men of stocky build, under thirteen stone, with no history of back or brain injuries. The stocky men stand up to carrying heavy loads—paratroops are not intended to look pretty.

The purely R.A.A.F. unit—No. 2 (Fighter) Operational Training Unit—exists to convert pilots to jet fighters for duty with No. 77 Squadron and with No. 78 (Fighter) Wing in Korea, and the Middle East. Pilots train on Mustangs and Vampires, with the two-seat DH-115 coming into use.

No. 2 O.T.U. took over this commitment, and was actually formed for this purpose, from No. 78 Wing, when the wing went to Malta a year ago. Its first Commanding Officer, Wing Commander P. Ottewell, G.M., A.F.C., handed over to Wing Commander R. C. Cresswell, D.F.C., in May, and his influence has been strong in the O.T.U.'s development. Before he left he told this correspondent that the quality of the present-day pilots passing through the O.T.U. was the best in the world. There never have been better pilots, he stated, and their training at Williamtown was as good as any anywhere else in the world.

No. 2 O.T.U. will see some interesting changes soon. All-jet training will start shortly, pilots flying only DH-115's and Vampires, the Mustangs being dropped.

Williamtown itself is one of the R.A.A.F.'s largest stations, as is shown by the rank of the Commandant, Air Commodore Knox-Knight. Intensely interested in every aspect of his command, Air Commodore Knox-Knight has been very busy on the works side as well as administering the School of Land/Air Warfare. No. 5 Airfield Construction Squadron is building a new airstrip capable of taking the largest jets. When this is completed Williamtown will be one of the outstanding R.A.A.F. establishments.

MISSING RESEARCH IN SOUTH-WEST PACIFIC AREA

BY FLIGHT LIEUTENANT D. A. J. KIBBLE, R.A.A.F.

AT the conclusion of hostilities, the Air Forces of the Empire were faced with the necessity of endeavouring to solve the problem of what had happened to many thousands of those who had become missing on air operations, and of whom no further news had been received. In the European theatre, this was handled by the R.A.F. and Dominion Air Forces' Missing Research Enquiry Service, and it is to be hoped that the very fine job done by this organization is as well known as it deserves to be.

Considerable discussion took place on the organization to be adopted for the Pacific searches. It was suggested that they should be on an inter-Allied, or at least, an inter-Service, basis, and an organization including the three Australian Services was approved by the Defence Committee. Fortunately the R.A.A.F. decided to carry out searches as an interim measure pending the setting up of the larger inter-Service organization, and this proved to be as well, because the inter-Service organization never in fact came into existence. It is to be hoped that on any future occasion the proposition that the R.A.A.F. should be responsible for its own missing research will be accepted as axiomatic. The problems of missing aircrew research provide questions which can only efficiently be dealt with from an Air Force point of view, and with which the minds of members of other Services, however competent, are not conditioned to deal.

It was not a question of aircrew experience. Most of the successful field searchers in the Pacific were, in fact, non-aircrew, and the preparation of the search briefs was largely the work of W.A.A.F. officers, but an air force background and outlook are essential. As an example, much confusion and unnecessary difficulty was caused by the impossibility of getting Army Graves Recovery Units to think in terms of crews, and not of individual bodies.

In the South-West Pacific the numbers involved were much smaller than in Europe, but the difficulties were very great, and for the most part of an entirely different nature. These difficulties arose not only from the entirely different nature of the terrain, but from the practices of the enemy. The Germans were most co-operative in reporting prisoners of war captured and in making available information about the dead.

The Japanese were always slow in reporting prisoners, and in many cases did not report them at all. The importance of definitely establishing the fate of the missing was accentuated by the hope, which many relatives maintained for long after the end of the war, that the missing might be hiding out in remote islands and jungles, and by the fear (in many cases only too well founded) that the men had survived the loss of their aircraft and died afterwards from starvation, ill-treatment, or the executioner's sword.

The Japanese not only did not give information during the war, but after their surrender they in many cases deliberately gave misleading information in an endeavour to conceal their crimes against prisoners. A favourite device was to say that the prisoners had left the area on a named transport which had in fact been sunk by Allied action. As a considerable number of prisoners had in fact lost their lives in this manner, it was very difficult to distinguish between the true and the false stories.

A notable case occurred in Rabaul, where successive batches of prisoners were taken from the Navy P.O.W. Compound, allegedly to be sent to Japan by ship. As it was proved beyond doubt that over 700 Australian soldiers and civilians had gone down in the *Monte Video Maru* in July, 1942, these stories at first received considerable credence. After the war, over 50 decapitated bodies were found in the naval execution ground near Rabaul, the majority of whom were definitely identified as persons whom the Japanese had stated to have been embarked for Japan.

Many of the most difficult cases were those in which evidence was obtained indicated that one or more of the crew had survived the loss of the aircraft, but had not been recovered alive after the end of the war. These cases involved prolonged questioning of natives, and interrogation of Japanese by the War Crimes investigators, and it was found in the majority of cases survivors had been murdered by the Japanese. In all, sixty-five definitely proved cases of deliberate murder were found, in all cases under the orders of the most senior Japanese officer to whom the capture had been reported. No cases were found in which R.A.A.F. survivors had been killed by a Japanese other rank on his own initiative. The practice of murdering captured aircrew was very general in most areas. In fact, on the whole of the New Guinea mainland and in the Netherlands East Indies to the East of Java, there were only three R.A.A.F. members who fell into Japanese hands and who survived.

In Europe, the area was for the most part thickly populated by people of a high standard of education and, except in Coastal Command, nearly all operations were over land for the greater part of the journey. In the Pacific the area was largely sea, and most of the rest, mountain, swamp and jungle.

The question of transport in such an area was one of great difficulty, and was solved in various ways. The greater part of the searching, even in the case of the great land masses such as New Guinea, was done by the use of sixty-eight foot sea-going trawlers. The party used the trawler as a base, and proceeded round the coast and up the rivers, landings being made to question the inhabitants of all villages as to any aircraft which had crashed in their district. In areas where sea predominated, amphibious Catalinas were used with great success.

The actual searching had nearly always to be carried out on foot, though the trawlers carried a jeep for use whenever possible. Owing to the rapidity of growth of tropical vegetation, it was found that, except in rare instances, wreckage could not be sighted from the air, and the searchers were, except in the rare cases where a very accurate pinpoint could be given by aircraft which had seen the actual crash, dependent on native information to locate crashes. In some areas, notably among the Ambonese and the Menadonese, the population was of a high standard of intelligence and, in fact, many of them are both literate and bi-lingual. Even among the more primitive people of New Guinea it was found that their memory of events and locations was very good, but it was rare to get a much more accurate estimate of dates than "Longa time Japan man 'e stop" (i.e., "During the Japanese occupation").

The two following cases illustrate the difficulties encountered. In September, 1946, Flying Officer Lloyd Cogswell left Lae to undertake a search of the New Guinea hinterland along one of the alternative air routes between Port Moresby and Lae. He arrived at Port Moresby three months later, after covering over 600 miles on foot, across mountains covered by tropical jungle and sparsely inhabited by natives who, in some parts, had had no contact with white men, and were suspicious and non-cooperative.

In April, 1947, Flight Lieutenant Belcher undertook a search for three B-25's lost in Ceram. One of these aircraft had crashed on the extreme summit of

10,000 ft. Mount Binaija, and was sighted from the air. Belcher made three unsuccessful attempts to reach the summit and was defeated each time by the difficulty of the native bearers carrying sufficient supplies up the precipitous jungle-covered slopes. The fourth attempt was successful with the help of supplies dropped to the party from the air. All three aircraft were located on the mountain and the remains of the crews brought back for burial.

In the case of an enemy who does not give full and accurate information about casualties, missing research is, of course, of the greatest importance; for experience has shown that it is not safe to rely on the evidence of accompanying aircrew alone in deciding whether death should be presumed.

Research in the Pacific revealed a number of instances of this, of which one of the most striking occurred in the Kai Island to the north of Australia.

Three B-15's were bombing in formation at about 5,000 gt. in broad daylight and perfect visibility. One aircraft received a direct hit and immediately burst into flames and crashed; crews of both the other aircraft stated that nobody baled out and that, in fact, the aircraft had crashed so quickly that no one could have had a chance to bale out.

Subsequent research proved conclusively that three of the six members of the crew had baled out and had reached the ground alive. One at least of them was uninjured and had it not been for the Japanese practice of killing aircrew prisoners, would have been alive and well today.

Many unusual stories were revealed by the investigations. Just before the end of the war a Liberator was shot down near Tomohon, in the Manado area of Celebes. Four members of the crew baled out and one of them, Flight Sergeant Victor Orgill, landed near the home of a prominent local Chinese family. The daughter of the household ran out to him, and although she knew that the Japanese had seen him bale out and were rushing to the scene, and that her action was quite likely to mean her death, warned him of the approaching enemy and urged him to make for the bush and escape. Orgill would not hide at once and said that he must try and help his friends. Almost immediately the Japanese arrived and seized him.

Fortunately the girl was able to convince the Japanese that Orgill had approached her to ask for directions, and nothing was done to her. When being led to the Tomohon gaol Orgill, apparently realizing what was probably in store for him, snatched a bayonet from the scabbard of one of his guards and died fighting. Two other members of the crew who were captured were chloroformed to death after the actual Japanese surrender and just before the arrival of the Australian Occupation Force, to prevent them from telling of the murders of other prisoners which had occurred while they were in prison. An interesting footnote to the story of Orgill is that the lady who endeavoured to help him is now happily married to a former member of the Australian Occupation Force.

In view of the vast areas of sea and jungle, the fact that more than sixty per cent. of the missing aircraft were located, mainly in or near the target areas, is considered to reflect great credit both on the searchers and on the accuracy of R.A.A.F. navigation, which was of course in this area largely by D.R., and without the aids available in Europe.

In the early stages all concerned, both at headquarters and in the field, had no precedents to guide them, and had to struggle on and learn by their mistakes. A vast amount of valuable experience has been gained which has, so far as possible, been recorded for use in the future if it is ever needed.

A veteran of the jungle searches looks over our shoulder as the above is written and says "It'll be easier next time, old boy; we'll have helicopters."

[National Defence Photo

THE R.C.A.F.'s NEW FIGHTER BASE AT ZWEIBRUCKEN, WESTERN GERMANY, OFFICIALLY OPENED, 25th APRIL

Shown signing the agreement covering the R.C.A.F.'s occupancy of the new base is General Roger Noret, Commander-in-Chief of the French forces in Germany. At far left is Group Captain Chester Hull, of Manotick, Ont., Commanding Officer of the Zweibrucken base, and at right is Air Commodore William MacBrien of Ottawa, acting Air Officer Commanding the R.C.A.F.'s Air Division in Europe. Following this, Defence Minister Brooke Claxton formally committed the Sabre jet fighter wing at Zweibrucken to the N.A.T.O. forces. The R.C.A.F. now has three Sabre fighter wings overseas, and a fourth is to fly over later this year to bring the R.C.A.F.'s N.A.T.O. Air Division up to its full twelve-squadron strength.

ROYAL CANADIAN AIR FORCE

R.C.A.F. N.A.T.O. BUILD-UP IN EUROPE CONTINUES

THE whistling thunder of three squadrons of R.C.A.F. Sabre jet fighters shattered the stillness of the German countryside at Zweibrucken, in the Saar area, marking the arrival of another Wing of Canadian fighters to take their place in the N.A.T.O. defence organization of Western Europe.

The three squadrons zoomed in over the ruins of Hitler's Siegfried Line, following a transatlantic flight from their Canadian bases in Ontario and Quebec. Their arrival meant another step towards establishment of the full R.C.A.F. Air Division that Canada has offered to the N.A.T.O. command in Europe. One more such wing of three Sabre squadrons is to fly across the Atlantic later this year and the R.C.A.F. will then have its full twelve squadrons established overseas. These twelve squadrons, comprising four wings, with the Air Material Base at Langar, in the United Kingdom, make up the R.C.A.F. Air Division.

The N.A.T.O. significance of the newly arrived wing was emphasized when it was turned over to N.A.T.O. by Defence Minister Brooke Claxton. A few minutes before the French High Commissioner in Germany, Andre Francois-Poncet, had handed the Zweibrucken base over to Mr. Claxton. Present at the ceremony also were Lord Ismay, N.A.T.O. Secretary-General, C. M. V. Drury, Canadian Deputy Minister of National Defence, and Alexander Ross, Canadian associate deputy minister of National Defence, as well as Group Captain Chester Hull, who commands the new base at Zweibrucken.

Speaking to the R.C.A.F. officers and men at Zweibrucken, Mr. Claxton emphasized the part they were playing in the over-all N.A.T.O. defence pattern. He said too, that while the Western world must welcome every effort to establish understanding and peace, "anyone who changes his actions because of an apparent change in the attitude of a Communist is not reading the record right."

For Lord Ismay it was a matter of being in on both the beginning and the ending. He had been an honoured guest, and had spoken to members of the wing when it assembled at St. Hubert for inspection by Mr. Claxton, a few days before starting the operation. Lord Ismay had then wished the wing God-speed, and was on hand at Zweibrucken to congratulate them on their flight, and welcome them into N.A.T.O.

The movement of the wing to Zweibrucken was known as "Leap Frog Three." Like the movements of preceding R.C.A.F. Sabre squadrons, the move was carried out in two phases. The first phase was completed by North Star transports of the R.C.A.F.'s 426 Squadron, based at Dorval, outside Montreal, which carried groundcrew, spare aircrew, baggage and equipment to bases along the transatlantic route, and to Zweibrucken.

In phase two the Sabre fighters marshalled at R.C.A.F. Station, Goose Bay, Labrador, from where they took off on the first leg of the operation, to Bluie West One, in Greenland. Unfavourable weather forced a two-week delay in Greenland before they could hop over to Keflavik, in Iceland. From Keflavik they flew to Prestwick, Scotland, and then across to Zweibrucken.

Throughout the movement of the Sabre squadrons, the 426 Squadron North Stars preceded the fighters to the next stopping point, being employed so that while one was waiting at the next stopping point, another was remaining with the squadrons, ready to take off with groundcrew and servicing equipment as soon as the fighters had taken off.

From this procedure came the movement's name—Operation "Leap Frog Three."

By now R.C.A.F. fighter squadrons are no novelty in peace-time Britain and Europe. The first R.C.A.F. squadron to go overseas for extended post-war duty was 421 Squadron. This squadron, which had been equipped with Vampire jets, left its St. Hubert home base in January, 1951, and moved over to the United Kingdom, where it began intensive operational training with the R.A.F. It left its own aircraft at home and was re-equipped with R.A.F. Vampires, being stationed at Odiham, where the recent Royal Review took place. Both the squadron's ground- and aircrew had gained much valuable experience by the time they returned to Canada in late 1951.

At about the same time that 421 Squadron was returning to Canada, the R.C.A.F.'s first peace-time overseas base opened at North Luffenham, in England. The base, a permanent R.A.F. establishment, was made available to the R.C.A.F., and No. 1 R.C.A.F. Fighter Wing formed there, the first squadron to arrive being 410, which arrived in November, 1951, bringing with it its own Canadian-built F-86 Sabre jets. This squadron, which had been stationed at St. Hubert, P.Q., made the crossing by sea—both personnel and aircraft—aboard H.M.C.S. *Magnificent*.

Several months later the second squadron arrived at North Luffenham. This was 441 Squadron, also from St. Hubert, and whose Sabre jets had been taken over by *Magnificent* along with those of 410.

In June, 1952, the third squadron arrived at North Luffenham, to complete the complement of the Wing there. This was 439 Squadron, from Uplands, near Ottawa, and its method of going over made Canadian aviation history.

In Operation "Leap Frog One" the squadron flew its Sabres across from its Uplands home base. Shortly before leaving, the squadron was inspected by Defence Minister Brooke Claxton, and then took off for R.C.A.F. Station, Bagotville, P.Q., pushing on from there to Goose Bay, and then over by way of Greenland and Iceland. The crossing, the first ever made by Canadian jets, was carried out without mishap.

Meanwhile, work was under way on preparation of the first R.C.A.F. fighter bases on the Continent. A R.C.A.F. planning team had gone to the Continent early in the year to form the nucleus of the Air Division headquarters, and to liaise with the French and with N.A.T.O. authorities on setting up these bases. At the same time the R.C.A.F.'s Air Material Base at Langar, near Nottingham, came into being. Duty of this A.M.B. is to provide logistic support to the R.C.A.F.'s overseas fighter bases.

Grostenquin was the first of the Continental bases to be activated, and the R.C.A.F.'s No. 2 Fighter Wing moved in there in October, 1952. Following the pattern set in "Leap Frog One," the Wing flew its own Sabres across from Canada. The mass movement, involving sixty Sabres, was made safely.

[*National Defence Photo*

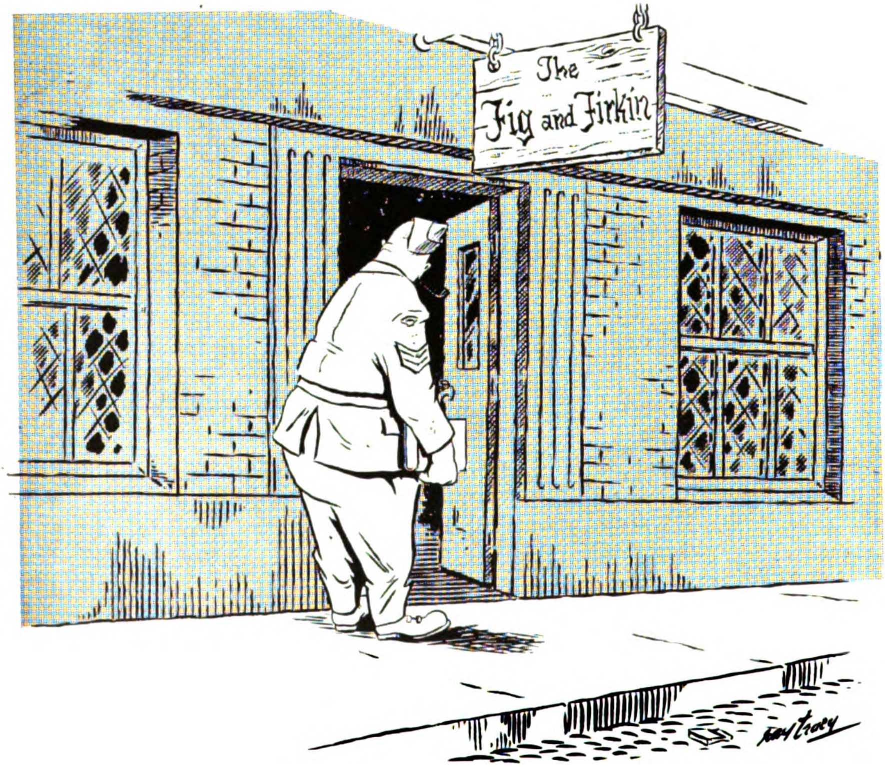
TAKE YOUR PICK . . .

A food store is always of interest to young, growing men, and this meat store at Zweibrucken, Germany, has a fascinating array of sausages and meats which they never saw back home. Admiring an oversized sausage are two members of the R.C.A.F.'s No. 3 Fighter Wing, L.A.C. Herb Retzer (left), of Creston, B.C., and L.A.C. Jim Vallier, of Timmins, Ont.

Shortly before "Leap Frog Two," announcement was made that Air Vice-Marshal Hugh Campbell had been named to head the Air Division. Temporary headquarters of the Air Division had been set up in Paris, pending readiness of the building just outside Metz, in North-East France, which now is its permanent home.

When the R.C.A.F.'s No. 4 Fighter Wing flies across later this year it will land at Baden-Sollingen, in Western Germany, where a new base is being readied. Next year it is expected that the wing now at North Luffenham will move over on to the Continent, to a base at Marville, France. This will bring all four wings into the general area of the Air Division headquarters, although plans call for the Air Material Base to remain in the United Kingdom.

The Air Division represents only a part of Canada's N.A.T.O. contributions. In addition to the fighter squadrons overseas, Canada has its 27th Army Brigade in Hanover, where it is grouped with the British Army of the Rhine. Apart from such operational elements, the R.C.A.F. is training aircrew in Canada for other N.A.T.O. nations. The first students from abroad arrived in Canada in late 1950, and since then more than 1,700 have been trained as pilots and navigators. At present there are more than 1,200 such students under training in Canada, and training is going on at the rate of approximately 1,400 a year. Students from the United Kingdom, Norway, Denmark, the Netherlands, Belgium, France, Italy and Portugal have been trained or are presently under training in Canada under this N.A.T.O. aid scheme. While on a smaller scale, the programme is reminiscent of the famed British Commonwealth Air Training Plan which the R.C.A.F. operated during the Second World War. Under the B.C.A.T.P. more than 131,000 aircrew from the United Kingdom, Australia, New Zealand and Canada were produced.



The trail, I soon found, led through many of the city's less conspicuous public-houses

SGT. SHATTERPROOF KEEPS FAITH

SIR,—We Shatterproofs are not prayerful men. None the less, I pray that this letter may reach you before Messrs. Gale & Polden have set their mighty presses in motion. For, Sir, it may well be that the last hope of England lies in you. It may well be that, while my report to the Home Secretary still lies becalmed in a Sargasso sea of red tape, AIR POWER will sound the tocsin that shall alert all England to the vipers within her bosom.

As for me, I seek no recognition for whatever part I may have played in the drama. It is enough that I shall have kept faith with Sergeant Snag. Even as I write, I seem to see his spirit rise up shining from the river bed where the Rozzers have no doubt cast his mangled remains. I seem to see him hoist aloft an astral tankard, and to hear his soldierly voice raised in a final commendation: "Not 'alf bad, me old cock sparrer! That'll learn the barskits!"

But this is no time for sentiment. I must hurry on.

As you are almost certainly aware, I was present in London during the coronation of Her Majesty, as ambassador without portfolio of the boys in the field. Though executive duties in the R.C.A.F. leave me small leisure for the perusal of newspapers, I am confident that *The Times* and *The Manchester Guardian* kept you fully informed of my public doings in your capital. Of my private activities, however, the world so far knows nothing.

I see you frown. "What," you ask yourself, "does the old wardog mean? Can it be that, dazzled by the tinsel of our metropolitan night-life, he abandoned himself to the tawdry pleasures of the flesh-pots? Can it be . . ."

No, Sir, it cannot. Even in his leisure moments, a Shatterproof never acts without purpose. The purpose that then motivated me was the tracking down of my old friend Sergeant Snag of the Royal Air Force, who (as I gathered from your letter of last May) was released on pension from the Service more than three years ago. It was my intention, should I succeed in locating him, to enlist his aid in preparing a *vade mecum* for the boys in the field; for, as I have mentioned on an earlier occasion, Snag's brief war-time sojourn in Canada opened a new chapter in the R.C.A.F.'s approach to the age-old problem of the Brass.

Applying techniques learned at the knee of my uncle, Daggerboy Shatterproof, of Canada's Secret Service, I spent several evenings in following the scent left by my old friend. Strong—indeed, almost overpowering—though it appeared to be at Air Ministry's Records Branch, from there on it faded with a rapidity that seemed almost to suggest deliberate self-effacement.

The trail, I soon found, led through many of the city's less conspicuous public houses—a circumstance which made my task more pleasurable and (thanks to my "Canada" badges) considerably less expensive than it might otherwise have been. It was, in fact, as I stood by myself one night in the saloon bar of "The Fig and Firkin" that my quest reached its amazing climax.

We Shatterproofs have gone down in history as being more at home on the field of battle than in the lists of love. Our achievements in war have, to a great extent, overshadowed our successes in the boudoir. When leftist historians, for example, applaud my ancestor Shun-Dalliance Shatterproof for having disembowelled a dozen or so of the landed gentry at the Battle of Naseby, they tend to overlook the fact that his nickname among the local milkmaids was "Bind-Him-with-Links-of-Iron." Therefore, Sir, it need occasion you no surprise that,

THE SEARCH FOR SERGEANT SNAG ENDS

Sure enough, it was Snag. Instead of the weathered uniform I remembered, he now wore a conservative grey suit, with an old school tie and a black homburg. Over his arm a malacca walking-stick at the moment my story opens, I was engaging in a little polished repartee with Rosie, "The Fig and Firkin's" buxom barmaid. To be specific, I had just uttered some urbane comment (as any red-blooded Canadian ambassador would have done) upon the superb modelling of her corsetry.

Rosie glanced down the counter to make sure that its other occupants were not listening. Then:

"You Canadians!" she said. "You ain't 'alf got a nerve! That sort o' talk may be all right in your 'eathen iggle-oos, but it won't get you nowhere with we English ladies. Besides," she added, lowering her gaze, " 'ow d'you know they *are* corsets?"

I explained to her that familiarity with internal affairs was the hallmark of the trained diplomat—"though we are," I admitted, "always ready to learn more."

Her eyes widened.

"Talk abaht brass!" she exclaimed. (I winced.) "Never 'eard the like of it in all my puff, I 'aven't! Why, I don't 'ardly know you!" She paused and peered up at the clock. "But if you like to . . ."

Her gaze went past me, and she stopped. Then she deftly patted her hair and turned to a man who had just approached the counter. She flashed him a golden smile.

"Good evening, Major," she said. "And wot'll it be tonight?"

"Ah, good evening, Miss Flowerdew. Lovelier than ever, I see. Well, now, I think a nice glass of port. . . ."

A Shatterproof, Sir, is not easily knocked down with a feather, but it would have taken no heavier bludgeon to prostrate me at that moment. For, though the racy accent was lacking, the voice that had replied was the voice of Sergeant Snag!

I leaned forward around my neighbours to get a clearer view of the speaker. Sure enough, it was Snag. Instead of the weathered uniform I remembered, he now wore a conservative grey suit, with an old-school tie and a black homburg. Over his arm there hung a malacca walking-stick.

Before I could hail him he caught sight of me in the mirror behind the bar. Instant recognition dawned in his eyes, but the next moment he touched his finger briefly to his lips and indicated by a slight movement of his head that I should step back from the counter. I did so, and presently he joined me at a table against the wall.

He grasped my hand warmly.

"Strike me pink!" he breathed, in the rich idiom of my recollections. "If it ain't me old cock sparrer Shatterproof! What on earth are you doin' over 'ere?" He broke off and glanced about him carefully. "But for Gawd's sake don't mention my name. I'm Major Orpington now, late of the Buffs."

The discipline of a lifetime asserted itself. I stood up.

"May I be the first of your old friends to congratulate you, sir?" I said.

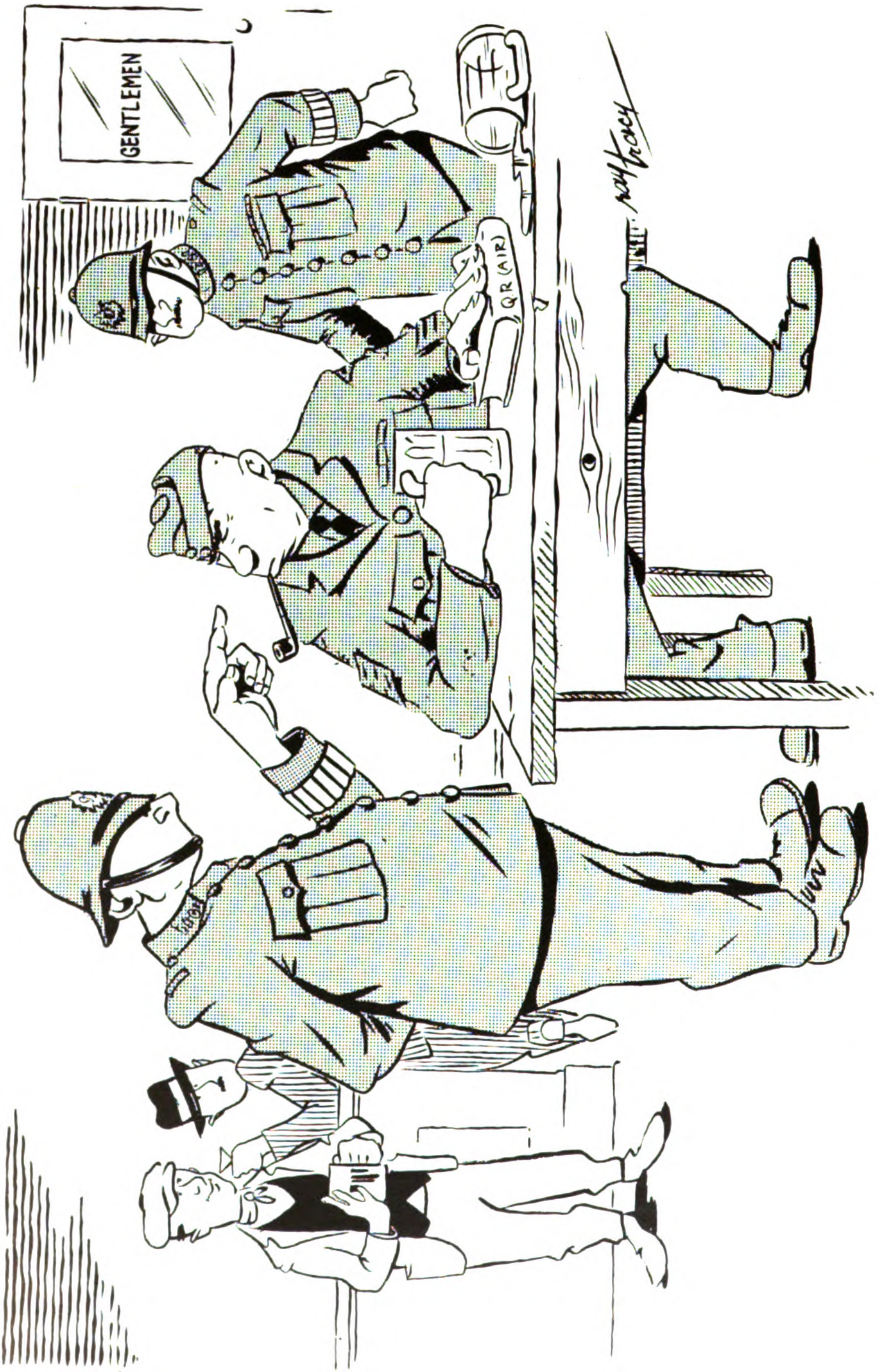
He gazed at me in astonishment. Then:

" 'Struth!" he chuckled. "Still the same old card, eh? Come orf it! I'm a major—well, for perfessional reasons." He winked and clinked his glass against mine. "Can't live on a pension these days, y'know. Mud in yer eye, mate!"

"Professional reasons?" I echoed. "You mean—" I lowered my voice to a whisper "Intelligence work?"

He hesitated and grinned.

"You might call it that," he said. "Operation Confidence. You know—oil wells and teak concessions in the Gilberts." He nudged me and winked again.



Sergeant Shatterproof on the defensive—is interrogated by "The Rozzers"!

Accustomed as I am to being the repository of State secrets, I was nevertheless deeply touched by Snag's trust in me. I lifted my glass.

"Sergeant Snag—that is Major Orpington—I salute you. England's secrets are safe with me. Per Ardua ad Astra!"

A peculiar expression crossed his face. It was consummate acting. Had I not been in the know, I would have sworn he was puzzled by my remark. I began to understand why Her Majesty had selected Snag for such perilous work, for an operation upon which the safety of England's supply of raw materials evidently depended. Well could I understand his frequent glances towards the "Fig and Firkin's" entrance. Every step the man took was probably dogged by the agents of rival powers. Yet casually he talked on.

"How're all the boys back in Canada?—includin' me old pal Gallstone."

"Fine, Major," I assured him. "But why don't we adjourn to my hotel room? In your line of work, you might be safer there."

He considered the suggestion, then nodded.

"You may be right, at that. Somehow or other the Rozzers got on me tail this mornin' and I've been dodgin' em all day. I——"

I stopped him.

"The Rozzers!" I repeated, incredulously. "You mean——?"

"I do, old cock. And they're pretty rough on us chaps these days. Fair skin us alive when they catch us. Pretty 'ard to watch out for 'em sometimes, too, wot with all the disguises they use."

The Rozzers! New though the term was to me, I had no difficulty in knowing what it meant. Even now, like the wolves of their native steppes, they might be hunting Snag through the dark labyrinth of London's side-streets, ready to drag him off to their underground hide-out for questioning with blow-torch and knout.

"But," continued my imperturbable friend, "let's have one more before we go. Wot'll it be? I'll——"

He directed a precautionary glance at the entrance—and froze.

"Cripes!" he said. "The Rozzers! Cheerio, old cock! Give the boys my love."

With that he slipped hurriedly away and vanished through a door marked "Gentlemen." Never, I reflected as I turned to face the enemy, did a hero disappear through a more appropriately labelled exit.

They were advancing purposefully towards me, two of them, dressed in perfect imitations of policemen's uniforms. I could hardly refrain from a grudging admiration. Even their plantigrade gait was indistinguishable from a genuine constable's. While one of them followed Snag through the door, the other took up a position by my table, hands behind his back, frowning speculatively down upon me. The other occupants of the bar, including Rosie, watched us with a detached British curiosity. To them, this was merely a routine "pinch." Little were they aware of the stark horror that underlay the scene.

After a few moments the second Rozzer returned.

"He got away through the window, Bert," he said. "But it don't matter. Jenkins'll catch 'im when he comes out of the alley." He turned to me. "And now, Sergeant, do you 'appen to know who that man is?"

Slowly I stood to my feet.

"My name is Shatterproof, my rank is that of Sergeant, and my number is 666. I am not called upon to tell you more. Nor am I deluded by those uniforms. You are Rozzers."

They exchanged glances.

"That's right, mate," agreed the one named Bert. "But you still 'aven't answered the question."

I looked him straight in the eyes.

"I have not, Rozzer. And all the red-hot pincers in the Kremlin will not drag one word from these lips. Furthermore, I claim diplomatic immunity."

The taller Rozzer lifted his helmet and scratched his head. Finally:

"Come on, Bert," he said, "this chap's just a Canadian Air Force bloke over for the Coronation. I saw a lot of 'em in the parade." He lowered his voice to interpolate something—presumably in Russian—that sounded like "Corked as a newt 'e is, too."

They turned about and, with a " 'Night, Miss" to Rosie and a "Sorry to 'ave troubled you, gents" to the room at large, marched out of the bar, back to their dreadful work.

Swiftly I considered my course of action. Personally, I was safe, rescued by my presence of mind and undaunted demeanour; but, somewhere in the night outside, my old friend Snag was already being led off to torment unspeakable. Should I arouse the peaceful citizenry about me, and form a posse for his rescue? Or should I observe the time-honoured tradition which demands that a nation disown its secret agents when they are caught?

In the end, Sir, protocol triumphed. I ordered another pint, drained it, and returned to my hotel, where I spent the night writing a report to your Home Secretary. I mailed it in the morning, before our aircraft took off on the return trip to Canada, but so far I have received no reply.

The fate of England, Sir, now rests with you.

SHATTERPROOF.

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SOUTH AFRICAN AIR FORCE

THE S.A.A.F. IN KOREA

WHEN the United Nations Organization urgently called on all member Nations to render material assistance to stricken South Korea, the South African Government decided to send a token force of one fighter squadron, which was to be attached to one of the United States Air Force Fighter/Bomber Groups operating in Korea. From among the many volunteers, fifty officers and 157 other ranks were selected, and preparations were made to move them to the Far East as soon as possible. This squadron was No. 2 Squadron, S.A.A.F., and known as the "Cheetahs."

The Squadron's first operational sortie was flown on 19th November, 1950, and the aircraft used was the famous Mustang of the Second World War. Over two years later, having flown 10,300 operational sorties against the Communists, the "Cheetahs" were withdrawn from operations to convert on to F-86 Sabres, which after a short conversion period flew in operations until the signing of the peace treaty.

Altogether 909 men have served with the "Cheetah" Squadron, 109 of whom were pilots, and during the period of operations in Korea the honours achieved were as follows: Legion of Merit, two; Silver Star, two; D.F.Cs., forty-eight; Soldiers' Medal, one other rank; Bronze Medal, seventeen officers and thirteen other ranks; Air Medal, 173; Clusters, 150.

The squadron, up to June, flew 11,345 sorties, amounting to 21,832 operational hours, an average of about 200 hours for each pilot.

This fine effort was not, however, achieved without loss. The casualties are as follows: Killed, ten officers and two other ranks; presumed killed, eight officers; missing, sixteen officers.

Of the missing only two officers are known with certainty to have been taken prisoner and one was repatriated to South Africa recently.

NEW TRAINING SCHEME FOR RECRUITS

In January 9,000 young men will be posted to Army, Air Force, Navy and Marine, and Active Citizen Force units throughout the Union to begin the Defence Force's new training plan, whereby recruits will spend an initial continuous training period of three months in camp.

The majority of the 9,000 recruits will be posted to units, but about 400 will be made up of volunteers for the South African Air Force pupil pilot training scheme, for the ground controlled interception unit (radar) and other special units. The period of continuous training for Air Force, Naval and Marine units has been staggered, and camps will be held in January, February and March, June and July, September, October and November.

In each of three succeeding years of the four-year training period recruits will spend three weeks on continuous training courses, giving them a total of about five months' continuous training at the end of their service.

ROYAL NEW ZEALAND AIR FORCE

By Flight Lieutenant G. Bentley, R.N.Z.A.F.

CONCERNING R.N.Z.A.F. PERSONNEL APPOINTMENTS

The following appointments have been announced since the issue of the July number of this journal:

[Photo: N.Z. National Publicity Studios

AIR COMMODORE M. F. CALDER, C.B., C.B.E., LL.B

Recently appointed Air Officer Commanding Royal New Zealand Air Force Headquarters, London

Air Commodore R. J. Cohen, C.B.E., A.F.C., as Air Officer Commanding R.N.Z.A.F. Task Force Headquarters, Auckland.

Air Commodore M. F. Calder, C.B., C.B.E., LL.B., as Air Officer Commanding R.N.Z.A.F. Headquarters, London.

Air Commodore C. E. Kay, C.B.E., D.F.C., F.R.Met.S., to be Air Member for Personnel.

Group Captain T. F. Gill, D.S.O., as Deputy Chief of Air Staff.

Group Captain I. G. Morrison, O.B.E., as Assistant Air Member for Supply.

Wing Commander W. H. Stratton, D.F.C. and Bar, as Commanding Officer, R.N.Z.A.F. Station, Ohakea.

Wing Commander D. F. St. George, D.F.C., as Officer Commanding Fighter-Ground Attack Wing, Ohakea.

Wing Commander B. V. Le Pine, as Commanding Officer, R.N.Z.A.F. Station, Lauthala Bay (Fiji).

Wing Commander K. W. Trigance, D.F.C., as Deputy Director of Organization and Staff Duties.

Wing Commander T. J. MacLean de Lange, D.F.C., to be Commanding Officer, R.N.Z.A.F. Station, Whenuapai.

Wing Commander A. S. Agar, A.F.C., as Director of Air Staff Policy and Plans.

Wing Commander J. J. McDowell, M.B.E., as Air (1) at R.N.Z.A.F. Task Force Headquarters, Auckland.

CURRENT EVENTS

R.N.Z.A.F. TO FLY HER MAJESTY ON ROYAL TOUR OF NEW ZEALAND

THE Royal New Zealand Air Force has been entrusted with the air transport of Her Majesty The Queen and the Duke of Edinburgh on all but one of their flights during the Royal tour of New Zealand which begins in late December of this year. This honour has fallen to No. 42 (Communications) Squadron, which will use a Dakota aircraft for the purpose. Formed during the Second World War, No. 42 Squadron's main responsibility for some time has been the transport within New Zealand of Very Important Persons.

When the Queen steps into her aircraft she will find the design and furnishings familiar, for the interior will closely resemble that of Viking aircraft used by Royalty for air journeys in the United Kingdom.

Besides the Queen's aircraft, No. 42 Squadron will provide another Dakota which will be kept in reserve for larger parties. If needed, the unit's Devon aircraft will also be used. Support for the Royal airlift will also be provided by No. 41 (Transport) Squadron, which, with Bristol Freighter aircraft, will carry the baggage of the Royal and official parties, servicing staff and other equipment.

The undermentioned officers have been selected to form "The Queen's Flight," and from these will be chosen the crew which will fly Her Majesty The Queen's aircraft:

PILOTS

CAPTAINS.—Squadron Leader C. L. Siegert,* D.F.C. (Fairlie), Flight Lieutenant W. M. Golden (Auckland) and Flight Lieutenant K. B. Smith* (Wellington).

SECOND PILOTS.—Flight Lieutenant L. A. R. Hill,* (Havelock North) and Flying Officer M. M. White (Auckland).

NAVIGATORS

Flight Lieutenant H. W. Shilton, D.F.C. (Mt. Somers, Ashburton), Flight Lieutenant R. H. J. Myhill* (Auckland, formerly London) and Pilot Officer G. C. Petterson* (Auckland).

SIGNALLERS

Flying Officer R. N. MacDonell (Hastings) and Pilot Officer G. R. Blackett* (Auckland, formerly London).

GOVERNOR-GENERAL PRESENTS BADGE TO No. 42 SQUADRON

A kereru, or native pigeon, in perching position, superimposed on a terrestrial globe on which New Zealand is high-lighted, is the centre-piece of a badge recently approved by Her Majesty The Queen for No. 42 (Communications) Squadron, R.N.Z.A.F.

The badge was presented to the Squadron by the Governor-General of New Zealand, Sir Willoughby Norrie, on his first official visit to R.N.Z.A.F. Station, Ohakea, the Squadron's base.

The kereru was chosen because, like No. 42 Squadron, it flies in all parts of the country. The Maori motto, "Tara ki uta, tara ki tai," may be translated as "We Span the Land."

OBITUARY

With the death of Group Captain R. Webb, D.S.O., D.F.C., in a recent air-

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* Also included in the crew for New Zealand's air race entry, the R.N.Z.A.F. Handley Page Hastings transport aircraft.

[*R.A.A.F. Official Photo*

The Air Officer Commanding the New Zealand Task Force, Air Commodore S. Wallingford, C.B., C.B.E., is welcomed to Cyprus by (left) Squadron Leader Max Hope, M.B.E., A.F.C., of Wellington, Officer Commanding the R.N.Z.A.F.'s No. 14 Squadron, and (right) Air Commodore V. S. Bowling, C.B.E., the R.A.F. Officer Commanding the Nicosia Station where No. 14 Squadron is stationed.

craft accident, the R.N.Z.A.F. lost one of its most valued senior officers and a man who at forty-one had not yet reached the peak of his career.

A widely known and respected officer, he was Commanding Officer, R.N.Z.A.F. Station, Whenuapai, at the time of his death.

Group Captain Webb joined the R.N.Z.A.F. in 1939 and served in Europe with No. 485 (N.Z.) Squadron. After commanding a Spitfire unit in the Middle East, he was appointed chief test pilot for the R.A.F. at Shaibah, Iraq. In Malta and Italy in 1943-44 he commanded 1435 Squadron of the R.A.F., and was Wing Commander (Flying) at the Headquarters of 323 Wing in Italy in 1944. In the same year he won the D.S.O. and the D.F.C. After completing a course at the R.A.F. Staff College, he was appointed Commanding Officer, R.N.Z.A.F. Station, Lauthala Bay (Fiji), while a Wing Commander. He was Deputy Director of Organization and Staff Duties at R.N.Z.A.F. Headquarters, Wellington, before taking command at Whenuapai with the rank of Group Captain.

[*R.N.Z.A.F. Photograph*

This photograph of the late Group Captain Webb was taken in his well-loved Spitfire when he was Wing Commander Flying in Italy in 1944

SOME RECENT FLYING FILMS

By Wing Commander C. N. Foxley-Norris, D.S.O., R.A.F.

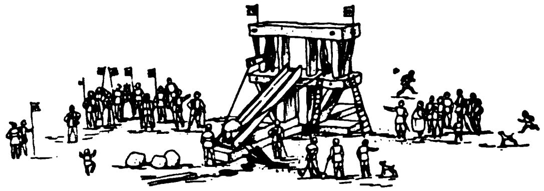
FILM makers operate in cycles. In turn, we have recently seen the boxing series, the atom spy series, and the conquest of space series. For some time after the war producers fought shy of subjects dealing with it, but in the last year or so several major war films have been produced on both sides of the Atlantic. Stories of the Royal Air Force constitute a large proportion of such British films, and recent examples include "Angels One Five," "Appointment in London," and "The Malta Story." The same period has seen the showing of two other British films directly concerned with modern aviation, if less so with its Service side, "The Sound Barrier" and "The Net."

Any film-goer connected with the R.A.F. or flying in any form will take especial interest in such productions. However, in making a critical judgment of them, he should remember that his special interests and knowledge are shared by only a small minority of the audience. The fact that he knows a certain incident or sequence to be unrealistic, improbable, or even impossible, may make him decry the whole, but he should bear in mind that the film-makers' basic aims are entertainment and profit, the one resulting from the other. If the producer can entertain and convince his audience, the fact that he does so by hoodwinking and deceiving them, may be held to be irrelevant, as long as his avowed object remains entertainment, not instruction.

Nevertheless, even if there is no doctrinaire intention, the audience will naturally tend to accept the ideas suggested by the film as factual. The power of the story is bound to have a compulsive effect, and they will leave the cinema believing, to varying degrees, in what they have been shown on its screen. To those who have the interests of the Service or aviation at heart, it becomes, therefore, essential that what is portrayed is in no way detrimental to either. It is less essential, but nevertheless desirable, that, as well as presenting flying and the R.A.F. in a fair and reasonable light, a film should stick to the facts as far as dramatic interest permits, and not offer an entertaining but wholly improbable version of events.

Producers realize this, and customarily employ Service or technical advisers to supervise such aspects of their films. It is up to these advisers to ensure that on their side of the house there are no glaring inaccuracies or improbabilities. In addition, the Service Ministries often co-operate in productions by furnishing men or machines for actual shots, or lending historical war time and combat film from their libraries. The Ministries concerned thus have some chance of ensuring that the facilities they provide are not wasted or used to present inaccurate or derogatory films.

It is in this aspect of realism and accuracy that the greatest variations occur in the three R.A.F. films referred to. All have proved successful, judging by critical reaction and box-office receipts, and acceptable to their audiences in general. Service viewers however, will detect considerable differences in quality. To them the worst by a wide margin must seem "Angels One Five." The ridiculous improbabilities on both Service and flying sides are too numerous to catalogue, but chief among the former may be noted the charming naïveté and "Boy Scout-Greyfriars" immaturity of the fighter pilots portrayed. Those who recall the off-duty activities of Battle of Britain pilots will be delighted by the reaction of his fellow-pilots to the news that "Septic," the aptly named hero, has actually made an appointment to take a young woman out to dinner; they



BARON FITZERMINE AND THE SIEGE-ENGINE

NOW this old Baron, Fitzermine, was filled with fear. Daily came reports that his neighbours, the young robber barons, were preparing to strike at his ancient castle. So he sent for his armourers.

"They tell me that siege-engines are all the rage," he said. "Build me the biggest and toughest siege-engine in the whole of Mercia."

"But, sire," said the Chief Armourer, "our enemies are many and will attack from all sides. The siege-engine is essentially an attacking weapon. It would not help us to defend ourselves."

"Build me the largest siege-engine in Mercia," the old Baron thundered.

"But, sire, there are no timbers within the castle strong enough for such an enterprise. And there are no missiles large enough or heavy enough to feed such a monster."

"Use the great beams of the inner keep for your construction," said the Baron, "and use the great stones of the outer walls as your missiles."

The armourers withdrew and began their labours . . .

Seven moons later the siege-engine was completed. It was fifty-eight hands in height, and ninety-two hands long: it could hurl a projectile weighing five hundredweight a distance of fifty-two yards. The Baron was delighted.

When the invasion began the engine counter-attacked and fired two rounds in the first day. One projectile landed in a swamp and drenched the enemy with spray ; the other merely lobbed over the castle wall and rolled into the moat where it formed a bridge for the invaders.

The first direct hit from the light siege-engines of the robber barons reduced the weakened inner keep to rubble, and the first wave of assault troops crashed through the weakened outer wall like a mailed fist through matchwood.

"Your trouble," said the robber barons as they led Fitzermine away into captivity, "is that you are living in the wrong century."

"I'm beginning to think you're right," said the Baron.

In pursuance of their firmly held beliefs in matters of twentieth-century defence against air aggression, Folland Aircraft Limited, of Hamble, Hampshire, have undertaken an intensive programme of research, design and prototype development.

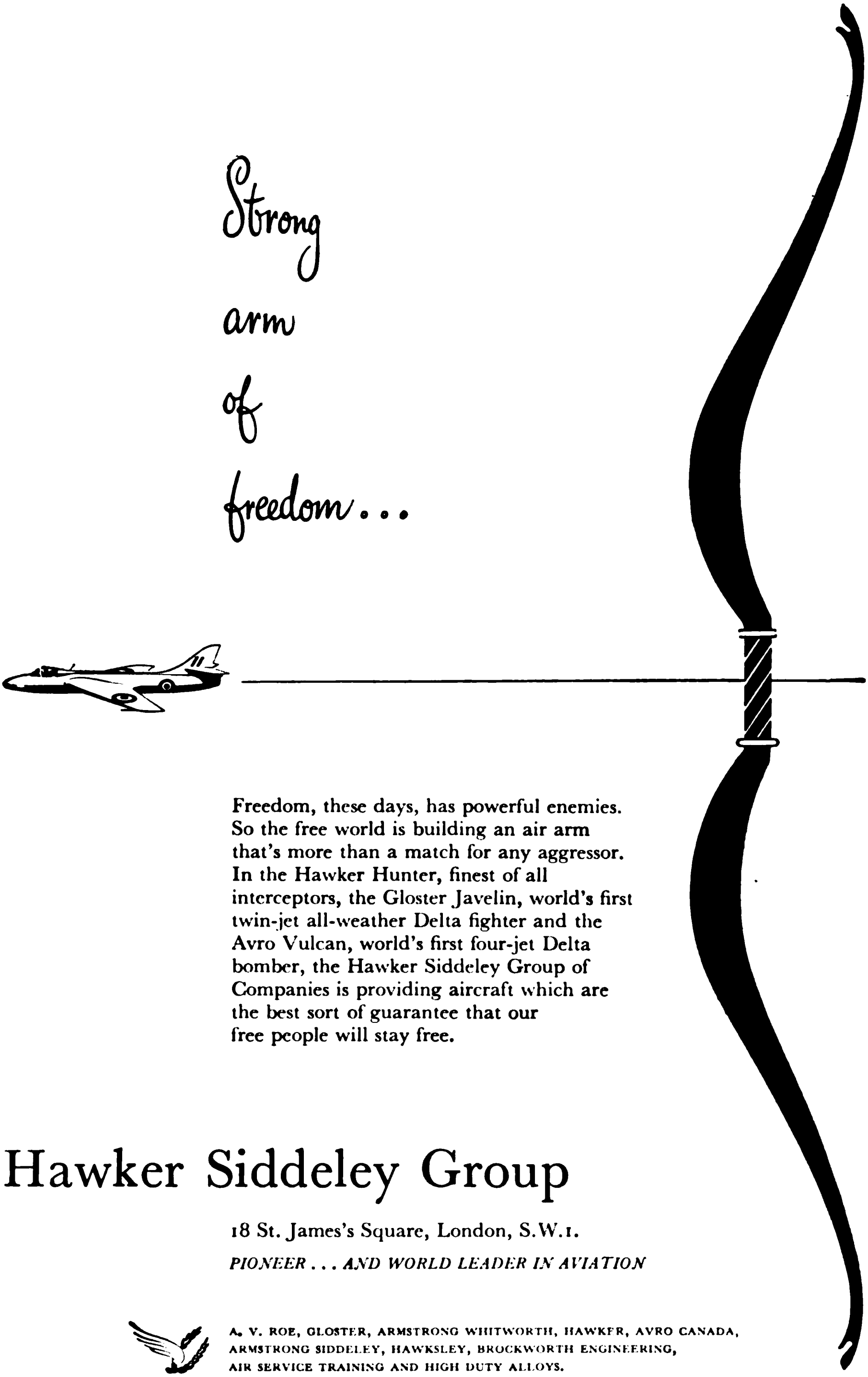
FOLLAND

think it is the greatest thing, and gather gaily round to mock and yet admire him for his adult daring. We are relieved to find that he justifies their confidence in his basic uprightness by abstaining even from the most honourable and British osculation with the lady concerned, though at one dreadful moment he is only saved by the bell (or rather an air-raid siren). On the more professional side, it is perhaps in keeping that, when he scores his first and only victory over a Me.110, which obligingly flies straight and level over the aerodrome, our hero is chaired all round the camp by his enthusiastic fellows, chanting what purports to be a traditional R.A.F. triumph song. Perhaps, however, their enthusiasm was justified, for, as presented here, the tactical approach and shooting methods of the wing concerned must have demanded a notable degree of skill and accounted for a disappointing number of victims. We are shown that their typical attack on a German bomber squadron (albeit plastic) was made vertically from several thousand feet directly above the formation, with the propellor windmilling and without deflection; an interesting, but scarcely constructive approach. The so-called Service adviser on this film must have had a very elastic memory—or a nasty gumboil from keeping "his tongue in his cheek" for such prolonged periods.

"The Malta Story" is a great improvement. The atmosphere of strain and privation, yet of magnificent spirit and high endeavour, is admirably reproduced, and the fine co-operation between the Navy and the R.A.F., which was the keystone of the successful defence, is clearly illustrated without melodramatic exaggeration. Much of the footage consists of actual combat film which is merged cleverly into the fictitious side of the production; as always, some of the flying models are inadequate, but on the whole only the most captious critic would find fault with the technical and flying side of the film. Only at the end is realism lost. The hero, portrayed by Alec Guiness, breaks radio silence, by authority, in his P.R.U. Spitfire many miles south-east of Malta to report an enemy convoy; he may be considered unfortunate that this results in his interception within less than a minute by flocks of Me.109's arriving from the north, presumably Sicily. However, he must himself bear some of the responsibility for his resultant demise, in that he is so occupied in giving a running commentary to base on the arrival of the opposition that he omits to take any evasive action whatever, and is smartly shot down by their first burst.

Nearly equal to "The Malta Story" in Service realism and accuracy is "Appointment in London," a story of Bomber Command's night offensive against Germany. This film was shot largely at the familiar war-time base of Upwood, and as a result the general atmosphere is sound; in addition most skilful use is made of the three Lancasters which were resurrected from retirement for the film to reproduce the sounds and sights of a fully operational bomber station. Dirk Bogarde is not very happily cast as a Wing Commander, but he overcomes his natural unsuitability and gives a credible impression of one undergoing the stresses and strains of those most intensive and arduous days; a minor criticism of the film is that the reasons for some of this strain, which appears largely self-inflicted, are not made wholly clear, and the impression is given that wing leaders made their own decision as to how long they stayed on operational flying. The surprising appearance of Dinah Sheridan on the station and in the briefing room is at least made somewhat less improbable, by a twist of the plot, than the Americans usually trouble to do when mixing blondes and aeroplanes. In any case, Miss Sheridan presents the type of amenity that is only too lacking on the average R.A.F. station.

Before turning to the films of non-Service aviation, there is one facet of recent



Strong arm of freedom . . .

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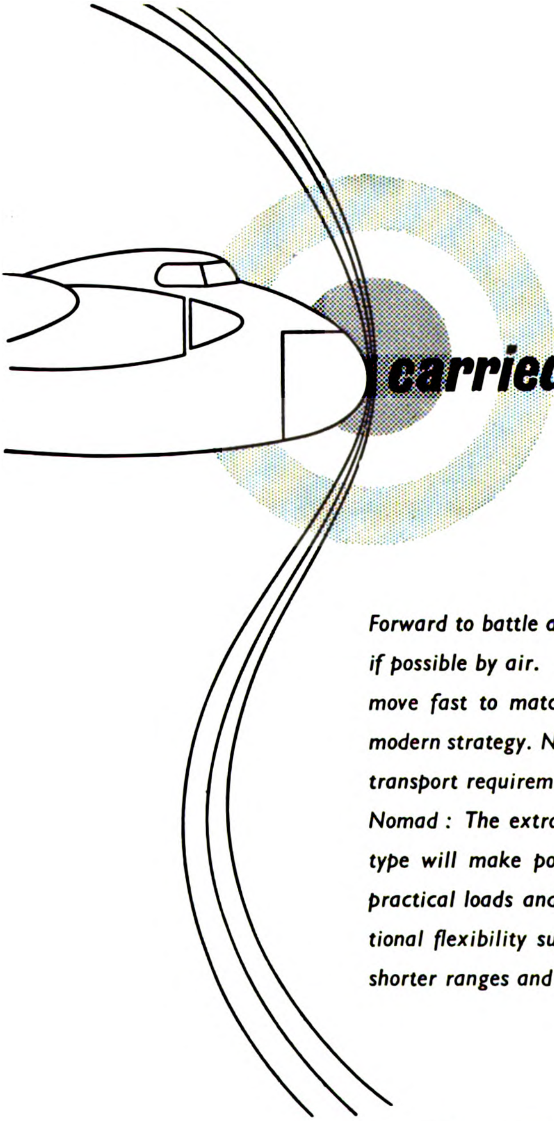
Service films that should be noted as of interest to all serving officers. Surely there should be some general instruction issued by Jack Hawkins in the form of a Young Officer's Guide to Rapid Promotion? We first encounter Mr. Hawkins in "The Cruel Sea" (an admirable film and a fine tribute to the Royal Navy) in 1939 as a Lieutenant-Commander, later rising to Commander; in 1940, in "Angels One Five," he is a Group Captain Station Commander; in 1941 we find him an Air Vice-Marshal, A.O.C. Malta. Presumably it is now up to the Army to present him with his baton, in the footsteps of James Mason's Rommel. The argument that promotion in the Army is customarily slower can be met by the example of "The Desert Rats," where Richard Burton rises from captain to colonel in 40 seconds; incidentally, anyone who ever served in the desert should not miss this latter film, if feeling in need of a really hearty laugh.

The high standard of technical accuracy in "Malta Story" and "Appointment in London" is raised still higher, on the civilian side of aviation, in "The Sound Barrier." Strictly as a piece of film production this stands head and shoulders above the other films mentioned, and indeed nearly all other films shown in recent years. On the flying side, it deserves a special medal for proving that the use of plastic models, the bane of all flying films, can be eliminated, and indeed much of its merit lies in its splendid photography of aircraft in flight. The high-altitude photography particularly has never been paralleled for excitement and beauty. The film has been criticized for exaggerating and over-dramatizing the perils of a test pilot's life, but that little exaggeration is involved can be shown by the already tragically large number of casualties among the actual pilots who appear in the film's credit titles. Another criticism, of unreality and over-simplification, has been made of the climax of the film where a pilot finally overcomes the problems of compressibility by reversing his controls to recover; however, it may be said in its defence that some solution is needed to bring the story to a satisfactory conclusion, and the one used is at least credible enough to the majority of the audience. If a film has to be unrealistic, it should at least offer the aeronautically improbable, rather than, as so often, the impossible.

This is brought out particularly in the last of our five films, "The Net." It makes no pretence at telling a factual or realistic story, but deals with aviation in the future, not the fabulous dreams of space travel and unlimited speed and altitude, but the presumably comparatively near future of Mach 2.8 and 80,000 ft. ceilings. It does, in effect, crystal gaze, but its roots have some contact in reality; the design of the futuristic prototype, which plays a leading part, the technical jargon, and the scientific background, are at least reasonably convincing; and the desolate atmosphere of a typical M.O.S. research station is accurately reproduced. There is a great deal of melodrama involved in the plot itself; it is never easy to believe in the story or the characters; and the flying models are, as always, unconvincing. However, as stated, aeronautical matters are treated at worst improbably, never impossibly. Sound advice has clearly been offered by expert advisers, and has been taken. The result is difficult to accept completely, but not wholly incredible or ridiculous.

There is a moral in this. If an avowedly futuristic film can accomplish it, any film should be able to do so. If makers of flying and Service films can obtain and benefit by sound advice, to produce good pictures, then it should be ensured that such advice is always available from genuine experts; and Service and other authorities should ensure that their facilities are only made available to film makers whose productions do credit to the Service or industry concerned, and never lay them open to unmerited ridicule or misunderstanding by the public.



carried forward

Forward to battle areas and danger points—if possible by air. Man and materials must move fast to match the fluid situations of modern strategy. Napier in 1953 emphasizes transport requirements in the design of tbe Nomad: The extraordinary economy of the type will make possible great advances in practical loads and ranges, while its operational flexibility suggests other functions at shorter ranges and lower altitude.

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BOOK REVIEWS

On Being a Bird. By Philip Wills. (Max Parrish, London. 230 pp.; 12 illustrations and other diagrams; 15s. 6d. net. 13.7.53.)

The author is an enthusiastic sailplane pilot with vast experience and has, as he so aptly describes it himself, "been bitten with the bug for longer than most."

His style of writing is light, yet masterful in description and he has in no sense attempted to write a technical text book for the practising pilot. He paints a picture for his readers of the air as it seems to the man or woman who approaches it in silent flight, as a medium almost more than material, having life and character of its own.

This world champion of 1952 is almost over modest when recounting his own experiences. These must have provided thrills innumerable—as for example when in his own sporting glider he took part in the development of radar during the Battle of Britain in the Second World War.

The explanations of gliding technique, with which he alternates his stories, open up an entirely new world to those less expert. Very early in this book one realizes that there is much, much more, to this sport than simply getting up into the air and staying there as long as possible. The strangest things happen to the uninitiated in clouds and human sense reactions become utterly unreliable.

The numerous stories of gliding experiences are indeed full of interest, extending as they do from an early cross-country flight in 1934 to the day he shot across the finishing line at Torresavinan to become world champion in 1952.

These stories of sport and adventure, this account of "living dangerously" and the comradeship borne therefrom among a small band of gliding enthusiasts, is not without its tragedy. The loss of two such comrades in the Alps during the international gliding contest at Samadan, is recounted in a manner which brings a graphic picture of the tragic end of a great adventure.

In an air-minded country such as Britain, it is with some amazement that one reads of the difficulties, particularly financial, with which individual gliding enthusiasts, not receiving Government assistance, are faced. It is not without amusement that the reader discovers how many of these are overcome by initiative, such as the "scrounging" of winches or building them out of old motor-cars or lorries.

A wave of enthusiasm permeates the book from start to finish and on closing it most readers will have been convinced by the author that gliding must be the most absorbing sport of all.

A. H. S.

Cover of Darkness. By Air Commodore Roderick Chisholm, C.B.E., D.S.O., D.F.C. (Chatto & Windus, 40 William IV Street, London, W.C.2. 222 pp.; illustrated; 12s. 6d.)

This is a true story of uncanny, 20th century, warfare; of a war between machines and radio waves rather than between men; fought four miles above the earth, in darkness—a lonely cat and mouse war, punctuated by sudden staccato bursts of cannon fire, a ball of flame curving slowly down through the night; then just darkness and loneliness again and the eerie, silent, impersonal search for another machine to destroy. That men are killed in the process seems incidental; for although the machines are devised by man, their purpose is to guide his hand towards more efficient self-destruction. The result is grimly reminiscent of the more imaginative science fiction of a dozen years ago.

Yet this particular "science fiction," almost more than anything else, helped to give us victory in World War II, for the story it tells is of the development of radar and radio devices which helped first to save Britain from destruction by enemy night-bombers, and then helped Bomber Command to smash the enemy's will to fight on in Europe. It is a personal story, told by one of the few pilots who flew in both campaigns and lived to see the end. More important, it is a new story, because the development of this once-secret British night-fighting equipment has never been told in detail before.

The narrative begins with an account of the author's refresher flying training in 1940, during which he progressed so slowly in comparison with younger pupil pilots that he was nearly grounded. There followed months of frustration, first at Northolt, then Gravesend and Middle Wallop, as a member of 604 Squadron, whose hopeless task was to try to intercept enemy night raiders in Blenheims fitted with primitive, unreliable A.I. radar. These chapters contain a wealth of information for those whose duty it is to study the morale of aircrews.

Then, in October, 1940, came the first Beaufighters and, through the skill of pilots like John Cunningham, the first victories. It is here that we begin to learn of the monotonous loneliness of night fighting, and its natural hazards, which took a greater toll of the Squadron's aircrews than did the enemy.

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The author achieves his first successes, two enemy bombers destroyed in one night; but just as the reader is becoming convinced of the infallibility of the green-eyed cathode tube, the short-comings of radar are shown by the accidental shooting down of a friendly fighter.

It will never be known, says the author, how many similar tragic mistakes were made, and we realize that, however wonderful the machines. only the human eye in the end can identify friend from foe. The importance of aircraft recognition training becomes apparent, and with it new realization of the dangers of exhaust glow, visible for one and a half miles on a dark night and an unfailing clue to identity.

Technically, the book is first class; there is beauty too in the descriptions of the night sky. The tremendous impact of the Mosquito on the progress of the war in the air has never been shown better, and it is fascinating to trace the complex development of radar in its many forms. There are thrilling accounts of fighter stalking fighter through the night sky over Germany, when Mosquitoes drew off and destroyed fighters that would otherwise have attacked our heavy bombers. The importance of tail-warning radar and I.F.F. identification are emphasized. An interesting record of post-war interrogation of enemy night-fighting experts, and a collection of twenty-seven excellent photographs complete a very worthwhile addition to the literature of air warfare. J. W. R. T.

I Flew for the Fuhrer. By Heinz Knoke. (Evans Brothers Ltd., Montague House, Russell Square, London, W.C.1. 187 pp.; illustrated; 12s. 6d.)

It is only natural to approach with suspicion the war story of a defeated enemy. Confidence is not strengthened when, after a few pages, the author admits, "I am certainly not the sort who believes fanatically in telling the truth at all times; but I thought it might be a good idea to do so then"—the occasion was a somewhat painful interview with his headmaster at the age of 16.

How far then can we believe Heinz Knoke's account of the dismay he felt when he shot down a reconnaissance Spitfire over Norway, and of his pleasure when a friend rescued the pilot by landing in the mountain in a ski-equipped Storch spotter plane? How much truth is there in his story of cigarettes shared and confidences exchanged with U.S.A.A.F. Thunderbolt pilot after both had been shot down over Germany? Would he still have emphasized this comradeship of the air if Germany had won the war?

We feel sure that the average reader will close this book convinced of its author's sincerity. He acknowledges with shame atrocities committed under the sign of the swastika, but makes no attempt to deny his admiration for his Fuhrer almost to the end, or his conviction, even today, that Germany's cause was just—though one cannot always follow his argument that Hitler's sole war aim was to protect Europe from Russia. Certainly Knoke never failed in his duty, for his record of fifty-two victories is the highest of any surviving German West Front fighter pilot.

Chief value of this book is that it tells the story of the air war from the enemy side, with unusual frankness. The author acknowledges the superiority of the Spitfire and Mosquito over comparable German equipment and gives excellent accounts of air battles which proved this superiority. He conveys well the early confidence of the Luftwaffe in its ability to win the air war. The Battle of Britain shook that confidence, and one almost feels sympathy at his later bewilderment when Allied air power grew with alarming speed, until in the end he was forced to fight against impossible odds in worn-out aircraft. The end came with the New Year's Day offensive in 1945, when the Luftwaffe lost 500 pilots in a hopeless attempt to gain a respite in France.

There is plenty of detail to interest the Service reader—including descriptions of such unorthodox tactics as interception bombing missions against formations of American Fortresses. But, above all, this is a readable book, with little to offend and much of real interest and value. J. W. R. T.

The Sea Shall Not Have Them. By John Harris. (Hurst & Blackett, Hutchinson House, Stratford Place, London, W.1. 256 pp.; 9s. 6d.)

One of the tragedies of war is that, in retrospect, it is an affair, not of flesh and blood, but of impersonal, unemotional statistics. While it is being fought, stories of extreme gallantry or abject horror reveal its true character; but there is room in the history books only for dates and statistics.

So we read that during World War II 13,269 lives were saved from the sea by Air-Sea Rescue, often under the enemy's guns. One pictures, momentarily, sleek, fast motor boats speeding through the Channel towards a yellow dinghy, a quick scramble up the side and a dash for home. No more. How often did we pause, even during the war, to consider the difficulties, almost impossibilities of finding a tiny rubber craft in the immensity of the ocean, with only the scantiest "fixes" of its position, perhaps in storm-swept seas?

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Or how often did we spare a thought for the men in the dinghies, with less than a 50-50 chance of rescue, cold, exhausted, cramped, thirsty, perhaps wounded, eyes aching unmercifully through searching almost hopelessly for a small boat or aircraft that could mean safety and life?

This novel tells the story of just such a raft, containing four survivors from a Hudson bomber shot down into the North Sea. One of them, an elderly air commodore, clutches a precious brief case containing details of Hitler's rocket weapons. The others include a Canadian navigator, the injured pilot and a wireless operator who faces court-martial for a trivial offence on his return.

It also tells the story of Air-Sea Rescue launch 7525, and of the men who man her. And of the tormenting hours of waiting for news at the missing airmen's home station. It is told simply, yet with great skill and an understanding born of experience, for John Harris himself served aboard an R.A.F. Air-Sea Rescue launch throughout the war. The result is an unforgettably vivid tribute to the men whose heroism and courage made possible those 13,269 real "happy endings."

It takes a remarkable book to earn the titles of *Daily Mail* Book of the Month, *Daily Sketch* Book Find, *Evening Standard* Book of the Month and a Book Society Recommendation. "The Sea Shall Not Have Them" is just such a book. J. W. R. T.

Sound Barrier. By Neville Duke and Edward Lanchbery. (Cassell & Co. Ltd., London. 117 pp., with 12 pp. of half-tone illustrations and 11 diagrams in the text; 8s. 6d. net. 27.8.53.)

This book, which not only gives a factual account of the stage of progress that aviation has reached in high-speed and high-altitude flight, but also an expert opinion on the possibilities of future scientific development, provides interesting reading to all who fly, are connected with aircraft design and performance, or are among the air-minded. To those who serve in operational units, "Sound Barrier" is of particular interest, as present developments and the trend of "Things to Come" (in the final chapter) can be linked with Air Power.

This nation, in the present critical international situation, depends for its survival upon the strength and efficiency of our Air Force. This book provides considerable material upon which to base discussions upon our hopes of building an Air Force capable of giving us adequate air defence in the future.

Although it contains a wealth of technical information, drawn from all the leading aircraft manufacturers in this country, the terminology is sufficiently simplified to be easily understandable by laymen with a basic knowledge of mechanics.

It begins with a survey of the problems of flight in transonic and supersonic regions. In its chapter upon design of engines for speed, it deals with the limitations of the piston engine and airscrew and development of jet propulsion, thrust augmentation, turbo-jet, turbo-prop, rocket, ram-jet, fuels and fuel mixtures. The review of selection of engines embodying different principles. In matters of design of high-speed aircraft it discusses aerodynamics with particular reference to supersonic flight and the evolution of modern aircraft design to satisfy new conditions. The physiological effect upon pilots of high-speed and high-altitude flying is of particular interest, with the many problems of atmosphere, pressure, temperature, "G" and the action taken to solve them with pressure-suits, pressure-cabins, "G"-suits and the reduction of heat by an inner lining or air cushioning.

The stage by stage design of representative types of modern jet bombers, fighters and civil air liners (prospective military transport aircraft) shows clearly the necessity to compromise between the ideal theoretical aircraft and practical considerations.

By the time the beginning of the last chapter is reached which deals with "Things to Come," the earlier chapters which contain an objective and factual report upon the history and evolution of high-speed and high-altitude flying, the reader will have gained considerable knowledge on its complexities and the principles of the design of aircraft and engines to contend with the conditions encountered. A. H. S.

THE AUTHORS

The two authors are both ex-Royal Air Force, the ex-bomber navigator Edward Lanchbery perhaps not quite so well known as his co-author. Neville Duke, Hawker's chief test pilot since 1951, is not only known for his cool calculated courage in testing every variety of modern high-speed aircraft or his record-breaking flights as a test pilot, but also as a Battle of Britain pilot with 28 enemy aircraft destroyed, with the D.S.O., D.F.C. and two bars and the Czech military cross. To this he now adds to the debt of this country to him, his personal contribution to our struggle to produce types of aircraft which will give us superiority in the air, now and in the future.

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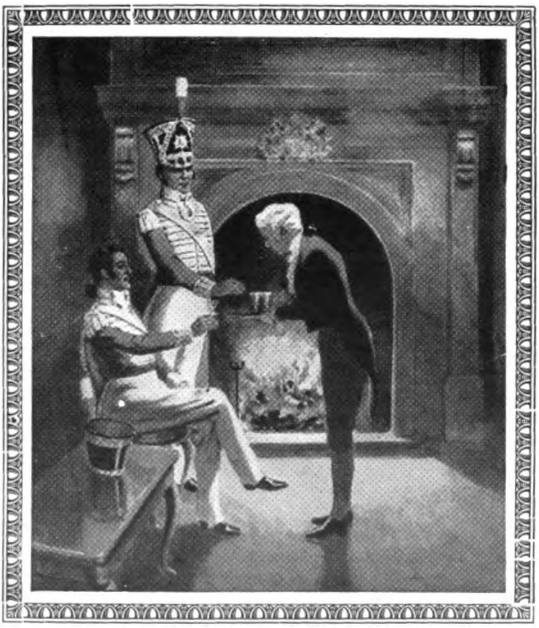

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***Sound Barrier.** By Neville Duke and Edward Lanchbery. (Cassell & Co. Ltd., London. 27.8.1953, 117 pp. 12 pages of half-tone illustrations and 11 diagrams in the text. 8s. 6d. net.)

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***The Sea Shall Not Have Them.** By John Harris. (Hurst & Blackett, Hutchinson House, Stratford Place, London, W.1. 256 pp.; 9s. 6d.)

Mascots and Pets of the Services. By Major T. J. Edwards, M.B.E., F.R.Hist.S. (Gale & Polden Ltd., Aldershot. 10.6.1953. 201 pp. 57 illustrations which include 4 coloured plates, 15s. net.) An interesting collection of stories and facts concerning mascots, both official and unofficial—in peace and in war—from the Crimea to the Second World War and intervening peace periods. The variety of animals and their origin as pets is vastly entertaining to animal lovers as well as being a contribution to our national records of this little-known aspect of Service life.

Geography from the Air. By F. Walker. Lecturer in geography in the University of Bristol. Methuen & Co. Ltd., London. 23.7.1953. 106 pp. with 96 plates and 3 diagrams. 30s. net.) Explains and illustrates fully the use of air photographs in the study of geography. It sets out in simple form the limited amount of technical information which is necessary in order to enjoy fully the fascinating experience of training oneself to appreciate almost every aspect of the landscape shown on vertical air photographs.

The Crowning of Elizabeth II. By L. A. Nickolls. (Macdonald & Co., London. 27.6.1953. 128 pp. 90 illustrations which include 4 coloured plates. 10s. 6d. net.) A diary of the coronation year. The author is in an authoritative position to describe royal events, being Exchange Telegraph Court Correspondent, officially accredited to Buckingham Palace.

History of the Second World War. U.K. Civil Series: Contracts and Finance. By W. Ashworth. (H.M.S.O. and Longmans, London. 1953. 22s. 6d. net.)

The Year Book of World Affairs: 1953. By G. W. Keeton and G. Schwarzenberger (Editor). [Stevens & Sons, London—for the London Institute of World Affairs.] 42s. This is an annual publication. The twelve essays in this volume include the following: The Atlantic Idea, by S. Strange; Five Years of Cold War, by H. Seton-Watson; The Balance of Power in the Far East, by J. Frankel.

"The Aeroplane" Directory—1953. Compiled by the staff of "The Aeroplane." (Temple Press, London. 540 pp. 15s. net.) This classified directory of British and Commonwealth Service and civil aviation appears annually. It incorporates "Who's Who in British Aviation." It is a most useful reference book covering information over a wide field of personalities, Service establishments, aerodromes, flying clubs and the aircraft industries, etc.

Coronation and Commemoration Medals, 1887-1953. By Lieutenant-Colonel Howard N. Cole, O.B.E., T.D., F.R.Hist.S. (Gale & Polden, Aldershot. 1953. 5s. net. 52 pp. Fully illustrated.) A description of coronation and similar medals issued in the past 60 years, and a brief account of the great events which they commemorate.

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* See "Book Reviews" in this Journal.

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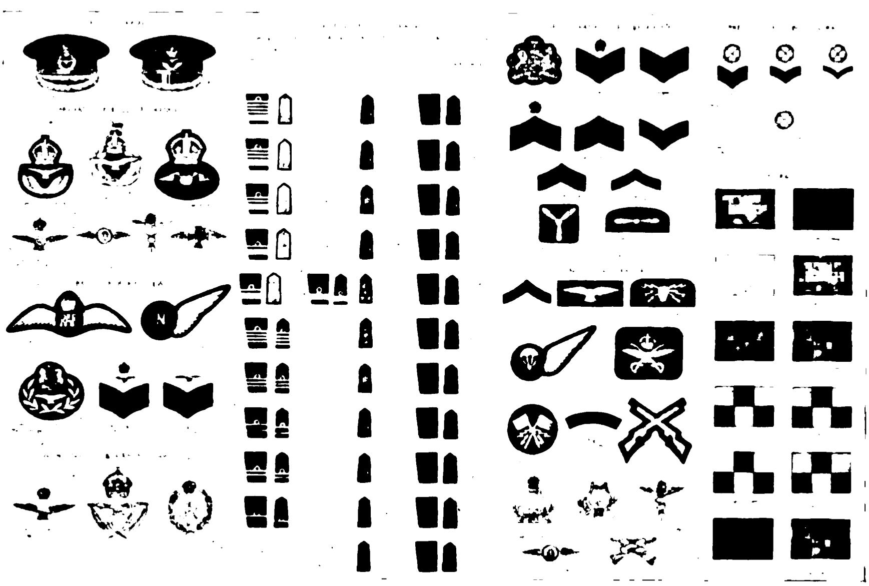

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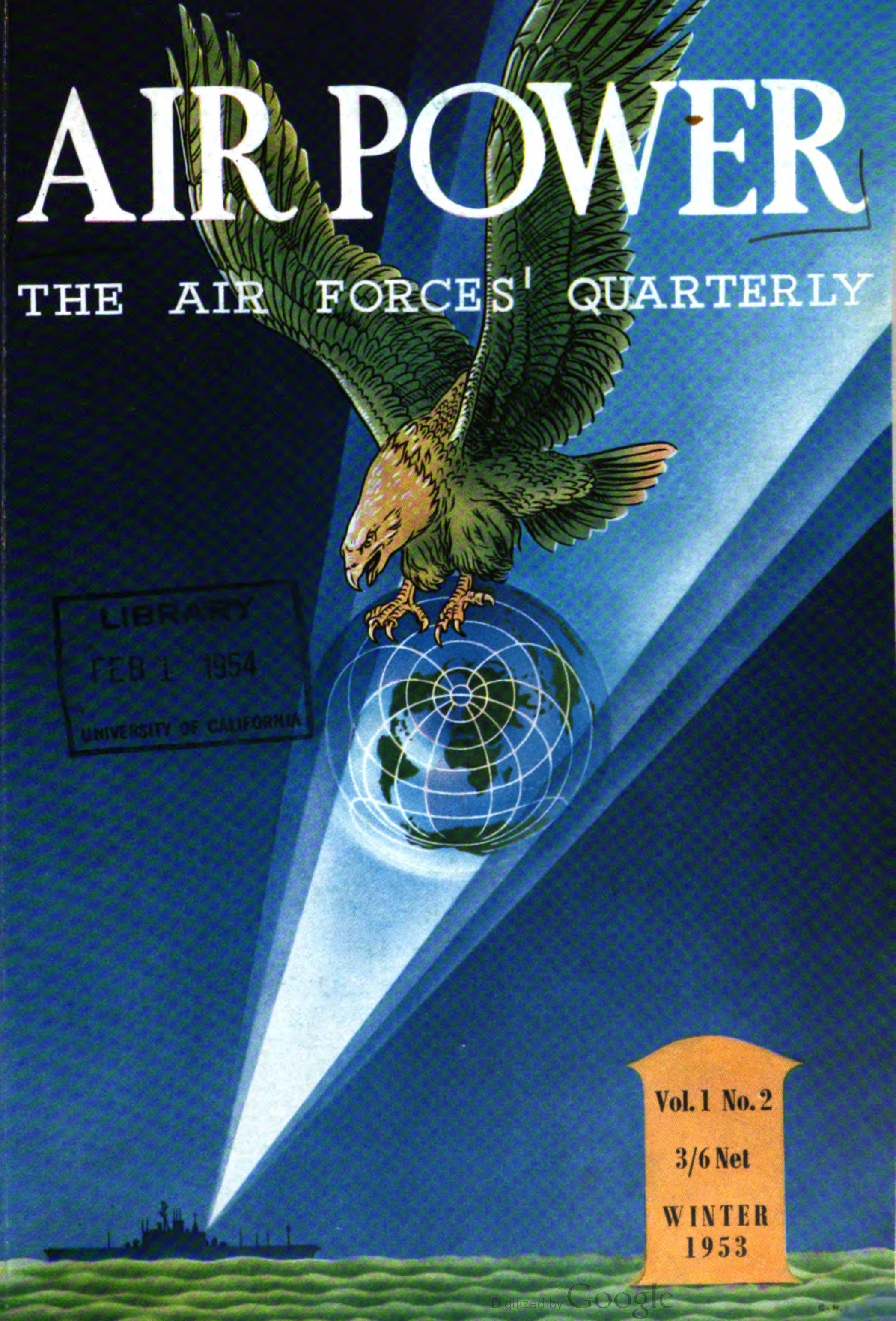

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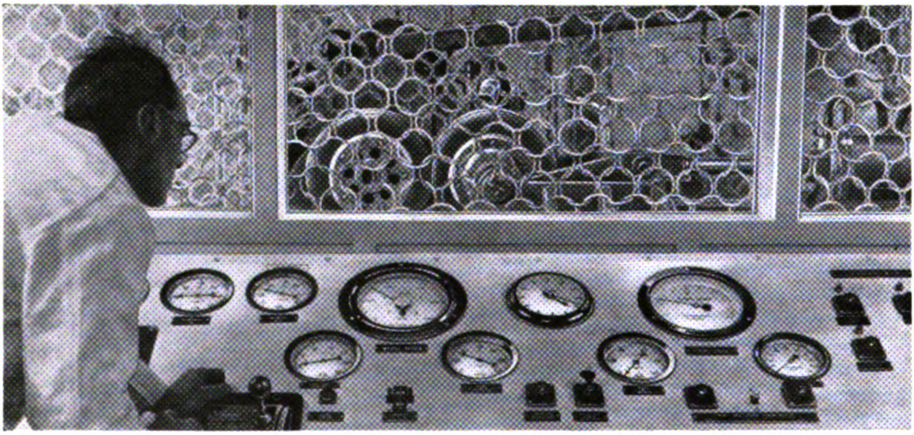
NEW TYRE-TESTING MACHINE REPRODUCES HIGH-SPEED JET OPERATING CONDITIONS



Controlling the progress of an actual test run. The machine can be seen through the double wall of safety glass, beyond the protective steel torpedo netting

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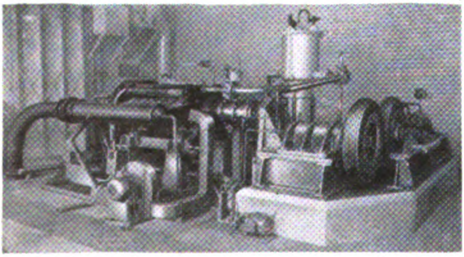
The startling progress of aeronautical design in recent years, so greatly influenced by the development of the jet engine, has confronted the tyre designer with complex problems. Thinner wing sections, which reduce retraction space, create a need for smaller-section tyres. But they also indicate higher performance—and a correspondingly bigger strain on wheel equipment. Just how successfully Dunlop has overcome these problems may be judged by the wheel equipment now fitted to the "Comet," the "Viscount" and many other advanced Civil, Military and Naval aircraft.



The test plant, showing the Merlin engine, the test-tyre and, on the far side, the 'slave' tyre and pneumatic ram.

An indispensable aid in all this work is test equipment capable of simulating actual operating conditions—both as they are now and as they are likely to be in the future. Here Dunlop has a unique advantage—a test machine that reproduces, for close and accurate study, the complete life-cycle of a high-speed jet aircraft's tyre. Mounted in a specially-constructed, well-protected building, the new plant is powered by a Rolls-Royce Merlin aero engine developing 1,725 b.h.p. at 3,000 r.p.m.—equivalent, with some tyres, to a surface speed of 300 m.p.h.

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[An Avro Photograph

THE SHAPE OF THINGS TO COME!

Vulcan delta bombers that can fly well over 600 m.p.h. at heights over 50,000 ft. Because of their delta lay-out, Avro claim that they will carry more bombs farther, faster and more economically than anything else in their class. One such aircraft, with an atom bomb, could do more damage than a last-war 1,000-bomber raid. Other shapes now seen in the skies above include superb British aircraft such as the four-jet swept-wing Valiant and the crescent-wing Victor bombers.

EDITORIAL

IN this first number of our journal in 1954, we are fortunate in being able to offer our readers a wealth of authoritative information on the absorbing topic of the use of air power in modern war.

The speech by *Marshal of the Royal Air Force the Lord Tedder, G.C.B.*, at the Mansion House, London, on 6th October, 1953 (the full text of which is now published for the first time), gives an over-all picture of the use of air power should war come in the foreseeable future, in the article entitled "The Shape of War to Come."

In the October number of this journal, the views of a distinguished naval officer were published on the employment of air power over the seas, entitled "Maritime Air Power," by *Rear-Admiral H. E. Horan, C.B., D.S.C.* Under the same title in this current issue will be found some very different views on the same subject by *Marshal of the Royal Air Force Sir John C. Slessor, G.C.B., D.S.O., M.C.* (*late Chief of the Air Staff*), which, with its authoritative facts and figures, will undoubtedly be read with the greatest interest. Another well-known authority on air power, *Air Marshal Sir Robert Saundby, K.B.E., C.B., M.C., D.F.C., A.F.C.*, has also contributed to this number an article giving a brief analysis on its proper use in modern war, entitled "Air Power—Air Mastery."

This is "The Air Age" in which air power will be the predominant factor in any future war. These three articles give the carefully considered opinions of those whose Service records and wide experience in the use of air power in war places them among the greatest living authorities in modern warfare in the Air Age.

UNITY OF PURPOSE

Paramount above all considerations today is the need for *unity of purpose* of all "Free Peoples" in resisting Communism.

It is vital that all other interests should be subordinated to this aim. If we are to present a united front in this, our national, party, secular and personal interests, which include traditional Service partisanship, must take second place.

The need for such drastic unification of millions of people in one set purpose is caused by new conditions and carries us into a "New Age." It presents great difficulties in its accomplishment as, of necessity, it undermines the traditional customs of centuries now firmly established and difficult to break away from, as well as demanding great personal sacrifices of fixed opinions and old loyalties. The thousand and one problems now barring the path to the unification of each nation's people, apart from the equal difficulties of the removal of all questions of discord between free nations, can only be solved by selflessness of purpose of individuals, which means a complete change in heart of a good many.

OUR FIRST NEED FOR ANY FUTURE WAR—AIR POWER

Bearing in mind the advice we have given on unity of purpose, we propose to consider upon what basis plans for any future war should be built.

The only potential aggressor is Russia, so we can face facts and not deal in vague generalities.

The vast spaces of that enormous country, which defeated the mighty and well-organized armies of Napoleon and more recently those of Hitler, and the numerical strength of the well-armed ground forces of the U.S.S.R., remove any possibility of the defeat by conquest of Russia by the land forces at our disposal.

With numerical predominance of the Soviet's air force, including a vast number of land-based bombers with their powerful escorts of fighters, any suggestion of a naval blockade, even if this would be effective, is equally fantastic. In any case, Russia's seaborne supplies are negligible. There is no doubt that at the very outset, with the vulnerability of this small island to an attack upon its overcrowded industrial areas we should be strained to the limit in defending ourselves; not only against attacks on this country, but against attacks by aircraft and submarines on our lifelines across the seas.

To maintain bulk supplies of food and munitions of war, which could not be delivered by air, without which we could only maintain the war for a very short period, our ships must continue to sail the seas unmolested by the enemy. The first battle would be for mastery of the air over this country and over the vast stretches of sea over which our supplies would have to come. That is by no means the total of the Air Force's tasks. Air cover for our ground forces on the Continent and protection of our advanced air bases would be another vital commitment, and last, but most important, all available bombers would be required to reduce at its source, the scale of air bombardment by the enemy upon us, while fighters would still be fully engaged in our close defence.

It must be abundantly clear that we should base our plans for any future war upon the capability of our Air Forces to win this first battle of the air. Our surface forces (fleets and armies) would be entirely dependent for their continued existence upon the strength of our air arm and the length of our survival in any future war would be decided upon that alone. If we fail in that, the strength and efficiency of the other Services will avail us nothing. Give us the air strength to win that battle and then our ships can sail the seas, with local air cover, against air and underwater attacks, and with the Allies' combined team of Navy, Army and Air Force we can, with our strategic bomber forces and the vast reinforcements we should receive after the brunt of the first battle was over, get down to winning the war.

Only from the air is Russia open to attack.

Adequate air strength immediately available for the successful undertaking of all these tasks is our first requirement for facing the present threat of war; upon this basis our plans should be built.

It is in air power that any hopes lie in checking, halting and finally throwing back any attack upon us. It is for this reason that those with modern knowledge of the proper employment of air forces in war continually recommend sacrifices in all quarters—military, naval and civilian—to provide the essential men, materials and unified control by those trained and experienced in modern air warfare, that we may by that united strength, have air power which will give us in our hour of need mastery of the skies.

Our greatest hope of removing the present danger of a Third World War does not at present, under existing conditions, lie in any meeting of the heads of the Great Powers or in appeasement, but in providing air power of a strength which will act as a deterrent to those in whose hands is a mighty instrument for aggressive war. With adequate air strength to oppose them, there is a very real hope that conciliatory conferences would prove fruitful, the dark clouds of war pass from us, general disarmament be agreed to and the financial resources of all countries diverted to better and more humanitarian purposes.

THE SHAPE OF WAR TO COME

A War of Continents . . . . .

Against Russia our traditional weapon of naval pressure is virtually innocuous. . . .

. . . it is only by making proper provision for utilizing the immense potentialities of the bomber that the requirements for pure defence, for the war at sea, on land, and for close air defence can be kept within reasonable financial bounds. . . .

SPEECH BY MARSHAL OF THE ROYAL AIR FORCE THE LORD TEDDER, G.C.B., AT THE LUNCHEON GIVEN BY THE AIR LEAGUE OF THE BRITISH EMPIRE AT THE MANSION HOUSE, LONDON, ON TUESDAY, 6TH OCTOBER, 1953

I HAVE no doubt that in this company there are very differing views regarding Oliver Cromwell and his activities. I know there are in my own family circle—which on this issue is indeed a house divided against itself. Nevertheless, I imagine that most people will agree that his instructions as to putting your trust in God and keeping your powder dry were good morally, politically shrewd, and from a military point of view wise, and I also imagine that the Air League would agree that the same fundamental idea is the foundation on which the League's activities are based.

There are, of course, some people who hold that trust is all that is needed and that to have any powder at all is unnecessary and indeed wrong. The trouble about such a policy is that in actual practice it would mean trust, not in God, not even in other nations, but trust, unsupported trust, in the individual politicians who happened to be in power in various countries. I'm afraid that in this world of ours such a proposition needs no comment. The fact is that, despite all the hopes which buoyed people up during the trials and horrors of the late war, the world has been forced, regretfully and bitterly, to the conclusion that the law of the jungle still runs, that security without strength is a mirage, that, in fact, weakness invites and indeed provokes aggression.

Now strength, national strength, is of course not solely a military affair; it is a complex of moral, political, economic and military factors, and weakness in any one direction may be fatal to the whole. One must never forget that these varying factors are closely interrelated, but it is mainly from the military point of view that I want to look at this problem today.

Nevertheless, the first point one must make is necessarily a political one. It has been said before again and again, and it cannot be said too often and emphasized too strongly, that the military strength which the free world has felt it necessary to build up has one prime objective—to prevent another war. It is questionable whether the two world wars or indeed the Korean war would ever have happened had it not been for political and military weakness which misled the aggressor into thinking he could get away with aggression without any serious fighting. There must be no room for doubt in the future. It must be made clear to all that the free nations have the will and the strength—the military strength—to resist aggression, and that strength must be such that it will be clear without a shadow of doubt that aggression will not pay. The would-be aggressor may well try to bluff—that has been the usual technique—but there must be no bluff about the defence; it must have real strength, strength of such a nature as to force a potential aggressor to think many times before even risking a war. Under present conditions it is only in this way that we can have any reasonable certainty of *preventing* another war. I repeat, our object is to secure peace, not by winning another war but by *preventing* another war.

How to organize the collective defence of the free world, to develop and maintain the military strength of a voluntary association of democratic nations who by their very nature abhor war, is no simple problem, and is not made easier by the fact that expert military opinion is apt to be divided on the subject. What form should the military strength of the free world take? In the first place I suggest that the military forces must be such as to constitute an effective deterrent, that is our primary objective; *but*, they must also be such as to be able to fight a successful war *if* the deterrent fails. One must therefore try to foresee what would be the nature of another war. It is sometimes said that the so-called principles of war do not change—in so far as human nature doesn't change that is probably true. But the shape of war has been changing drastically during this century, and I believe we would be making a fatal mistake—and I mean fatal—if we were to shape our forces on the basis that a war in the future would be on the same lines as those of the last war. War having in the old days been a matter of formal battles and developing in the First World War into a struggle for lines, the tragic mistake was made before 1940 of preparing for a repetition of the struggle for lines. I hope the bitter tragedy of the Maginot Line and the lesson it affords will never be forgotten. In the event, during the last war it was the war in the air—unforeseen by many and still not understood by some—which was largely responsible for changing the shape of war: the war became one of areas. It might well be that a future war would be one of continents.

So far I have deliberately left the possible aggressor anonymous, but it is no use burking the issue that unless and until the new régime in Moscow (or its successor) clearly by word and by deed renounces the Stalin aim of world domination, the potential aggressor is in fact Soviet Russia.

That fact poses specific problems. All the N.A.T.O. nations (and particularly Britain) depend on seaborne supplies and are therefore vulnerable to attack at sea; all, and again especially Britain, are vulnerable to attack from the air; all the Continental nations are open to attack by land over the relatively short distances from Russian-occupied territory.

What does this mean? Does it mean that we must in peace time build up and maintain massive armies with all their supporting air forces on the Continent of Europe on the scale which it took four years of the combined British and American nations to attain? Does it mean that we must also during peace build up again the vast numbers of ships, vessels and aircraft we had in 1944 to secure our sea communications? Does it mean that every nation must build up air defences—the great network of communications, anti-aircraft and fighter defences—which proved to be necessary in the last war?

I suggest that to attempt to build up military strength on these lines would be not to provide a deterrent to aggression but to bankrupt the free world and hand it over to Communism and chaos without a blow. Yet military power we must have, defences we must have.

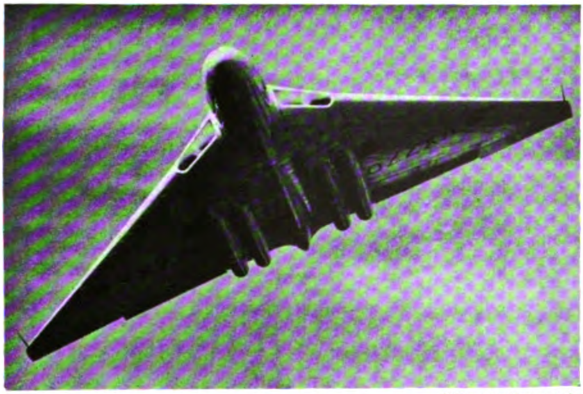
Let us look at the other side of the picture. Russia's seaborne supplies are negligible and against her our traditional weapon of naval pressure is virtually innocuous. The history of Napoleon and Hitler should be sufficient proof of the folly of attempting land invasion of those vast areas. Only from the air is Russia open to attack.

There is the problem.

I have no simple solution, but I do think we tend to make the problem unnecessarily difficult by failing to consider it as a unity. There is still a tendency to regard the war at sea, on land and in the air separately. Defence of sea communications being a matter for naval ships and ship-borne aircraft, the land campaign a matter of divisions (with, of course, supporting tactical aircraft) and air defence a matter of anti-aircraft radar and fighters. For some reason which defeats me, many people forget or ignore the other force which in the last war proved to be the one common factor and did in fact unify the operations in the three elements—the bomber force. The impression seems to have got about that the bombers were a slightly disreputable party that burnt down German cities to no real purpose. It is forgotten or not known that the bombers played a vital part in limiting the production of submarines, that the waters round Denmark were littered with German shipping sunk by bombers' mines, the end of the *Tirpitz* is forgotten. It is forgotten that it was the bombers that were mainly responsible for strangling Rommel's army, that it was the bombers that knocked the Luftwaffe out of Sicily and made the entry into Southern Europe possible, that it was bombers that strangled the communications in Northern Europe, starved German transport and grounded the Luftwaffe for lack of fuel and made Operation "Overlord" possible. It is forgotten or not realized that after the first round of the Battle of Britain had been so gallantly fought in 1940 and 1941 by the day and night fighters it was the bombers that pushed the air war away from British skies to be fought out and won over Berlin; it is forgotten that it was the bombers that delayed the V1 and V2 attack for vital months, reduced it to an unpleasant nuisance, and were the *only* antidote to the V2.

I emphasize all this about the bomber, the offensive component of defence, because I feel it is absolutely essential to remember that purely passive defence with no offensive element is in practice no defence at all. The noble art of self-defence would be a pretty ineffective business if the boxer had no straight left or right hook. In 1944 the Germans were producing (at the expense of their bomber production) more fighters per month than the total British and American production—they were losing the air war.

I also emphasize the bomber for two other reasons. Firstly, I feel that it is only by making proper provision for utilizing the immense potentialities of the bomber that the requirements for pure defence, for the war at sea, on the land, and for close air defence can be kept within any reasonable financial bounds. Secondly, it is the bomber and the bomber alone that can, under present conditions, provide the essential offensive element of our defences and act as a real deterrent.



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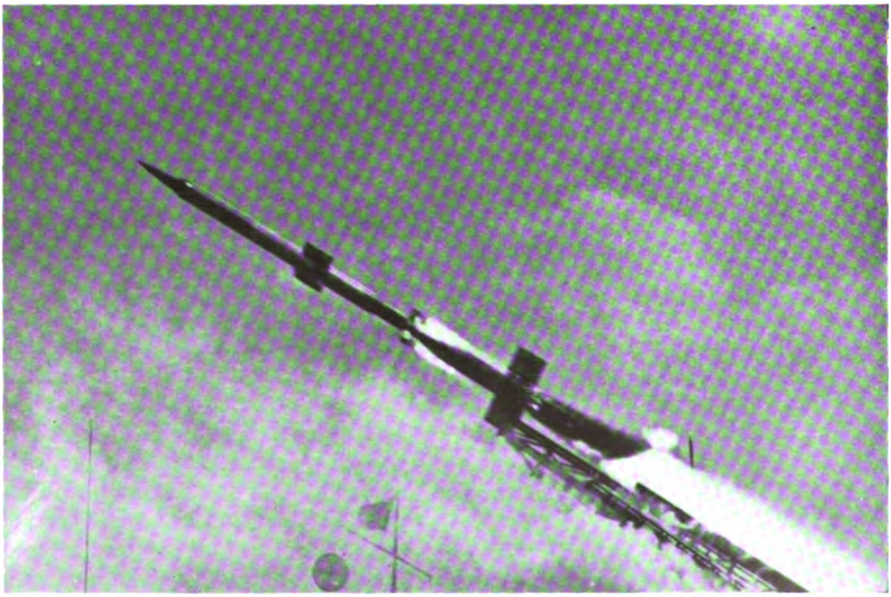
The bomber—the offensive component of defence . . .

I can imagine you may be thinking that I am falling into the error which I have myself denounced—living in the past. It has been suggested that what has been called push-button warfare is just around the corner and that fighters are already obsolete. I would not venture to prophesy what may or may not be possible in ten years' time, but I do know that there is a long, long time-lag between a successful theory and its general application; that gap is inevitable; we don't want to fall into it. There have been spectacular advances in aircraft performance; there may well be further advances yet to come; by and large those advances tend to aid the bomber as against the defence—though the guided projectile may find its first use to help the fighters solve a problem which gets more and more difficult. All the indications are that in the immediate future it will be more true than ever that the bomber will get through.

And that brings me to what is, I feel, the crux of the whole problem—the atomic weapon. There are, of course, people—very sincere people—who would ban its manufacture or use. The armoured knights of old wanted to ban the use of gunpowder. I can understand the Russians proposing that it should be banned, since it is the only effective counter-threat which the Western Powers can wield as a deterrent.

On the other hand, I believe there are very few people in this country who have more than the vaguest idea as to the fearful potentialities of the atomic weapons now within sight. It is no Jules Verne story to say that war with these weapons might literally destroy European civilization. I am sure I am not being an alarmist in saying this. I believe this to be an accurate, cold statement of the actual possibilities now ahead of us. I only regret that we in this country are not given more of the facts. If our American friends can face up to them, surely we can, and if we were on an equal footing with them in public awareness of the subject I believe we might be of value to each other in arriving at a balanced judgment as to what action to take. I have seen reports that the American authorities are seriously considering putting the bulk of their defence efforts into passive air defence against atomic attack. With all respect to the experts who may have given that advice, I myself believe such policy would be a fatal mistake. I frankly do not believe such defence could be really effective even at a cost



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The guided projectile may find its first use to help the fighters . . .

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It is the bomber and bomber alone that can provide the essential offensive element of our defences and act as a real deterrent . . .

which would—or at least should—be prohibitive even for the wealthy United States. I also believe that to adopt such a policy would greatly increase the risk of war and of atomic attack, since the deterrent afforded by the atomic bomber force would have been sacrificed. I am one of those who believe that for some four or five years after the surrender in 1945 aggression was averted by the U.S atomic bomber force. I do not think that the fact that the Russians have now developed their own atomic weapons really lessens that deterrent effect; the fearful counter-threat is still there.

This, then, is the major factor we must take into account in looking ahead. To my mind it makes it more than ever essential that our aim must be to prevent war.

This may seem a pretty gloomy picture—the world divided into two armed camps with the contestants holding a pistol at each other's heart. But I believe there are real grounds for hope. A contest using the atomic weapon would be no duel but rather mutual suicide—that is scarcely a prospect to encourage aggression. No, the development of the atomic weapon has brought the world face to face with the ultimate realities of war, and provided that the free nations make it clear without a shadow of doubt or vestige of bluff that they are ready and able to deliver the atomic weapon and face that ultimate issue I believe that sanity will prevail. There was a time when it might have been doubtful whether democracies with their natural abhorrence of war and tendency to live in the present would have the solid judgment and the sense of responsibility to accept such an issue and its implications in peace time. As it is, I think that one of the most remarkable developments in this uneasy post-war world has been just that —the growth of a real sense of mutual responsibility among the free nations, and nowhere more remarkable than in the case of the United States, despite their natural absorption in their own problems and their traditional distrust of external commitments. At the same time I must make it clear that I would not for one moment accept the thesis which has been put forward occasionally that because atomic development is expensive, because atomic bombers are allegedly expensive, because the United States already has an atomic bomber force, Great Britain should leave this element of military power to the United States.

I believe that now and in the difficult years ahead our British experience and judgment in world affairs are and will be of vital importance to the world at large. If we accept the position that the United States, loyal and stalwart friends though they are, are the sole arbiters in the atomic field, we should no longer be a great power, our influence would be negligible and our ability to help lead the world would be lost.

No, in the scientific and technical, in the military and in the political aspects of the atomic world we have a vital part to play. If we were to shirk that responsibility I would indeed be gloomy: if we play our part I have real hope, hope that we can show an example of courage and determination, patience and faith which will inspire the free world and give time for the fundamental human rights of fredom of speech and thought to spread their sway over the whole world, time for police states to become free, time for truth to prevail.

I agree with Cromwell on this issue: let us trust in God and keep our powder dry.

THE APRIL NUMBER, 1954

Among the articles being published in the next number of AIR POWER will be the following:

War on Logistics, by Dr. J. M. Spaight, C.B., C.B.E., LL.D.
Developments in Fighter and Bomber Design,* by John W. R. Taylor.
Life on the Royal Air Force Station at Henlow,* by Wing Commander H. R. Patterson, O.B.E.
The Changing Face of Southern Russia,* by Flight Lieutenant J. F. Long, M.A.
War and the Technician, by Wing Commander E. J. Tippett, B.Sc., Ph.D.
With the Indian Air Force Today,* by Group Captain Bruce Robinson, C.B.E.
Order No. 3, "Bonfire Night" (In Lighter Vein), by H. R. P. P.
Air Power and the Future of the Royal Navy, by Flight Lieutenant R. Brickwood.
A Future for Airships, by Squadron Leader P. W. Helmore.
The Royal Swedish Air Force,* by Ossian Goulding.

There will be in addition the usual supporting articles, **The Air Forces in Parliament, Current Events, Matters Concerning R.A.F. Personnel, Sport in the Royal Air Force,* Book Reviews** and **New Books,** as well as articles of interest from **The Commonwealth Air Forces.***

As will be seen from the current (January, 1954) number, AIR POWER contains a wealth of information on military air affairs, by authoritative authors, of today and the future. It provides a veritable handbook on the air power of many nations, its effect on any future war, both from the strategical and tactical aspects. Bound volumes of this journal will gradually build up a history of air power through the years, its many changes and the effect of those changes upon the world. Why not order your own personal copy (3s. 6d. net) and have them bound each year, using these volumes as reference books to answer your many problems on air power?

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* Fully illustrated.

MARITIME AIR POWER

By Marshal of The Royal Air Force Sir John C. Slessor,
G.C.B., D.S.O., M.C.

THE basic fallacy underlying Rear-Admiral Horan's article in the October issue of Air Power is epitomized in its title "Maritime Air Power" and defined in one sentence towards the end of the article: ". . . the object of the Navy is to see . . . that it has sufficient air power available at instant notice to deal with any threat to our sea routes." There is no such thing as "Maritime Air Power." Air Power is indivisible; there is no high water mark extending to the stratosphere and no black art about the employment of air forces over water as opposed to over land. The Navy is no more capable, even with the assistance of Coastal Command, of achieving the object ascribed to it by Admiral Horan than the Army would be capable, with the assistance of a Tactical Air Force, of being able to deal at instant notice with any threat to our own or Allied territory. If there is one lesson which sticks out further than another from the late war—the first air war—it is that it is Air Power *as a whole* that does these things; Air Power one and indivisible, and including the elements of Maritime and Tactical Air.

Rear-Admiral Horan's article has something in common with certain criticisms of Air Policy which have been appearing in the R.U.S.I. Journal and which I answered in an article in the August, 1953, issue of that journal. I will not repeat here the points I made in that article—anybody who is interested can look it up for themselves. But the Admiral writes with a more than usually breezy disregard for facts; and, lest any of your readers should be tempted to imagine that his article represents the last word on the subject, I think it is desirable to set out certain facts which may throw a rather different light on it.

Perhaps I should make it clear that I think the transfer of the Fleet Air Arm to the exclusive control of the Admiralty in 1937 (not 1939) was inevitable and in the circumstances right. The other system *could* have been made to work, but never *would* have been made to work; so I think it right that the change was made. On a long view I don't think it matters very much. I regard this carrier era as a temporary and appallingly expensive phase through which we had to go. It is the misfortune of the British and American taxpayer that the late war ended in a blaze of glory for the aircraft carrier in a Pacific campaign against an enemy whose Air Forces, split up between their Army and Navy, were so inefficient that they had to fall back on the forlorn expedient of the *kamikaze*. But in ten years' time the carrier, which will be at the mercy of a guided bomb with a small atomic warhead, will be universally recognized as obsolete—to the great relief of the taxpayer. By that time there should be a better way of providing anti-air cover to convoys at sea than packing a lot of ordinary fighters into a single hull that would undoubtedly be the first target for attack. Nevertheless, I still think the 1937 decision was unavoidable and indeed overdue.

I will not comment on the Admiral's somewhat over-simplified and not wholly accurate account of the evolution of the Fleet Air Arm between 1918 and 1939. It is true that "the Navy can hardly be said to have been ready" to meet the "novel menace" of air attack on shipping. One of the reasons for that was that the pre-war Naval Staff would never accept that menace as being as formidable as the Air Staff thought it would be. I would be the last to claim omniscience for the pre-war Air Staff; we made many mistakes—in the absence of any real experience of air warfare; but we were certainly never accused by pre-war naval critics of *under-rating* the capacity of aircraft to sink ships—on the contrary, we were constantly told that our claims were grossly exaggerated.

Now let us have a look at some of the real facts, as opposed to Rear-Admiral Horan's ideas about them—the quotations are from Admiral Horan's article.

1. "As a direct result of the post-1918 policy, when the Second World War broke out the Navy was very short of senior officers with a thorough understanding of what air warfare over the sea meant."

   Twenty-one years had passed between the 1918 decision and the outbreak of war, and there was absolutely no reason whatever why in September, 1939, the Royal Navy should not have had plenty of senior captains and some Flag Officers with more than twenty-one years' practical experience of what air warfare over the sea meant, *if they had chosen to do so,* which they did not.

2. At the outbreak of war "the air component of the Fleet was totally inadequate. Consequently, our shipping became a prey to the new form of attack, etc."

   Every component of British strength, except the surface vessels of the Navy, was totally inadequate in 1938. But under the Trenchard/Keyes agreement of July, 1924, the Air Ministry was responsible for the provision of aircraft and equipment for the Fleet Air Arm in accordance with the needs of the Admiralty, who specified the numbers and types required—and paid for them. The Admiralty provided the carriers.

   All three Services were starved under the "No war for ten years" rule. But after that was cancelled in February, 1933, there was nothing to prevent the Admiralty building more carriers—if necessary at the expense of other classes, such as battleships—and indenting on the Air Ministry for the necessary aircraft. It is certainly open to doubt that the Admiralty would have been able to get priority for a much higher proportion of our then totally inadequate air resources, in face of the looming threat of German air preponderance at that time. But that decision rested with the Government, acting with the advice of the Chiefs of Staff and Committee of Imperial Defence.

3. "Consequently by the beginning of 1941 the Merchant Navy had lost between one-quarter and one-third of its ships and 50 per cent. of these losses were due to attack by shore-based aircraft."

   The actual facts are that by the beginning of 1941 the Merchant Navy (i.e., merchant vessels under British ownership) had lost less than one-fourteenth of its ships (650 out of 9,488). The proportion of tonnage lost was rather higher—roughly one-seventh. Of the 650 ships lost, 95, or about one-seventh, were sunk by enemy aircraft.

4. "About this time (June, 1941) a small proportion of our Air Power was made available to assist in the control of sea communications."

   Coastal Command was just less than doubled in strength between September, 1939, and June, 1941—just about the same percentage increase as that of Bomber Command, though less than the Fighter Command increase. The actual proportion of our U.K.-based operational strength represented by Coastal Command in June, 1941, was 18 per cent., and this does not take account of the fact that since the outbreak of war a significant proportion of Fighter Command's effort had been devoted to cover of coastal convoys—to say nothing of the terminals of our sea communications, the ports.

5. "To produce aircraft at the decisive point—the convoy—and in sufficient numbers, it is essential to be able to fly them from aircraft carriers."

   This is a really staggering statement. The facts are that carrier-borne aircraft engaged on convoy escort and support killed 38 German U-boats and shared another 8 with other types of escort; of these, the 58 carriers of the Royal Navy accounted for 13 and 6 shared—the remainder being killed by Americans. Shore-based aircraft on convoy escort and support (almost all Coastal Command) killed 83 German U-boats and shared 17 kills—more than twice as many.

   The records of the number of enemy aircraft shot down by carrier-borne and Coastal Command fighters respectively are rather vague, but ship-borne aircraft shot down about 50 in the Atlantic and North-West European waters and Coastal Command between 100 and 150. In neither case was anything more than a small proportion shot down in the vicinity of convoys. The R.A.F. figure, of course, does not include the large numbers of enemy aircraft shot down by Fighter Command while attacking our coastal convoys or endeavouring to protect their own.

I think I have said enough to show that Rear-Admiral Horan is not a critic to be taken very seriously. Officers who write this sort of article in Service journals really ought to be a bit more careful about their facts. Admiral Horan says there are people who "quite honestly look upon an aircraft carrier as both a very expensive and vulnerable way of providing aircraft at the decisive point." At least a very substantial indication of the answer to the question whether or not these people are right can be found in an objective examination of the facts about what carriers and the aircraft operating from them actually did in the late war—what the cost of them was in terms of national resources and what dividend they paid compared with other methods of exercising sea power. Let us, therefore, examine factually the economics of British Naval Aviation in the Second World War, expressed in terms of its impact upon our various enemies at sea and compared with the corresponding facts for British shore-based aircraft.

The Navy exists to exercise sea power. At least a major yardstick of the efficacy of any component of the Navy is the number of enemy vessels of various types destroyed. This is not a complete answer; there are other factors such as the number of our own vessels saved from being sunk, and "side-lines" of sea power such as support of the flanks of land operations. But these factors apply at least proportionately to shore-based aircraft.

The figures are summarized in tabular form below. In considering them it must be borne in mind that statistics do not always present an entirely fair picture, and must always be interpreted with some qualifications. The carrier Fleet included a total of fifty-eight carriers commissioned at or after the outbreak of war, with all their attendant escort and auxiliary craft. The first-line strength of the Fleet Air Arm at the outbreak of war was 232 aircraft, rising to 1,290 on VE Day; but it would be unfair to count all these 1,290 as capital producing the very meagre dividend in Column I of the table because from time to time Fleet Air Arm squadrons operated from shore bases; for instance a substantial proportion of the enemy shipping destroyed in the Mediterranean by shore-based aircraft fell to squadrons of the Fleet Air Arm based ashore.

It may not be irrelevant here to note that the Inskip award of 1937—which has since been largely disregarded—retained shore-based aircraft as the responsibility of the R.A.F.

Again, the results in Column II of the table were achieved by a very large aggregate number of shore-based aircraft—certainly far more than 1,290. Of the 221 U-boats destroyed at sea, the great majority fell to Coastal Command, which began the war with about 300 and ended it with about 750 aircraft, including fighters and anti-shipping strike squadrons. But of the other types of enemy vessel destroyed, the great majority were by squadrons of Bomber Command and shore-based British and American Air Forces in the Mediterranean. Against that it must be remembered that action against enemy ships was only a part—and by no means the major part—of the war effort of these squadrons. For instance, of the 500 enemy ships sunk by air-laid mines, the majority represented, so to speak, a "side-line" of Bomber Command's war effort.

All this being said, an indisputable fact which seems to me to arise from a study of the economics of naval aviation is that the dividend in the form of impact upon the enemy paid by this armada of great ships with their hundreds of first-line aircraft was diminutive in relation to the enormous capital investment involved, and in comparison to the terrific toll levied by aircraft operating from shore bases.

	By Carrier-borne aircraft R.N.	*By British shore-based aircraft*
A. Enemy U-boats.		
Destroyed at sea (other than by mines)	20	221
Destroyed by mines laid	1	16
Destroyed by bombing in port	—	22
Totals	21	259[1]
B. Enemy warships other than U-boats.		
Destroyed in N.W. European waters and Atlantic	13 (20,000)[2]	339 (275,000)
Destroyed in Mediterranean	11	55[3]
Sunk by mines laid in N.W. European waters	1 (251)	218 (147,578)
Totals	25	612
C. Enemy merchant ships destroyed[4]		
In N.W. European waters at sea ..	21 (52,753)	195 (492,000)
In N.W. European waters in port ..	—	68 (155,526)
In N.W. European waters by mines laid	9 (16,388)	290 (552,741)
In Mediterranean	17 (50,000)	293 (871,000)[3]
Totals	47	846
D. Total enemy vessels all types[5]		
Destroyed (excluding non-combatant small craft)	93	1,717

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[1] Does not include considerable number destroyed by bombing before completed.

[2] Figures in brackets represent approximate tonnage where known.

[3] These figures include ships sunk by U.S.A.F. and Fleet Air Arm shore-based aircraft, as well as R.A.F., Commonwealth and Allied squadrons.

[4] "Merchant ships" include supply ships, tankers, troopships, etc.

[5] The above figures do not include the Pacific and Indian Oceans. In these waters the British carrier-borne aircraft claim to have sunk one Japanese minor warship, nineteen merchant vessels (44,000 tons) and seven barges and junks, and to have destroyed 240 enemy aircraft. A very much greater number of ships were sunk and aircraft destroyed by shore-based squadrons but the figures are impossible to sort out as between the R.A.F., the Commonwealth, and the United States Air Forces.

Inevitably we find towards the end of Rear-Admiral Horan's article that the usual thought has at once sprung to his mind: Why not take some more away from Bomber Command to be "devoted to the war at sea"? Well—suppose we had done so. Suppose at an appropriate moment we had diverted sufficient resources from the build-up of Bomber Command to provide, say, another 20 carriers and 400 first-line naval aircraft. On the law of averages those additional carriers and their complements would have accounted for perhaps 7 more submarines, 8 more minor naval vessels and 11 more merchant ships. The effect on Bomber Command's ability to contribute to the attainment of that air supremacy upon which our sea communications and their terminal ports primarily depended for their immunity from air attack, can, of course, only be a matter of conjecture.

I wonder if it would have been worth it?

A "FORUM" FOR DISCUSSION ON SERVICE AFFAIRS

This journal is intended to provide a "forum" in which ideas can be put forward on air matters and in particular those connected with the defence of this country in war. We realize that articles on professional Service subjects will meet with a measure of disagreement and other views will require to be studied. If the purpose remains "the effective defence of this country" *and no other considerations are allowed to bias the study of the subject, constructive debate will be built up. There is no limit to the extent to which such discussions can benefit, not only individual Services as effective economical members of the team, but also our whole national defence. By so doing there would be no danger of any discord arising between our Fighting Forces.*

It has been suggested that no controversial matters should be published in this journal. With this view we do not agree and it is not in accordance with our editorial policy. Clearly to do so would provide sound grounds for accusing us of being biased in our outlook on air matters or of taking up an "ostrich-like" attitude to opinions contrary to our own.

Our policy is to deal more with affairs of today and the future rather than dwell upon those of the past. We aim to be progressive. For this reason, when discussions on Service problems arise, we always regret to see references to acrimonious Service jealousies of long ago which not only serve no useful purpose but can be harmful to* our unity of purpose *in providing the best defence for our country that our national economy can afford on land, on the seas and in the air.*

EDITOR.

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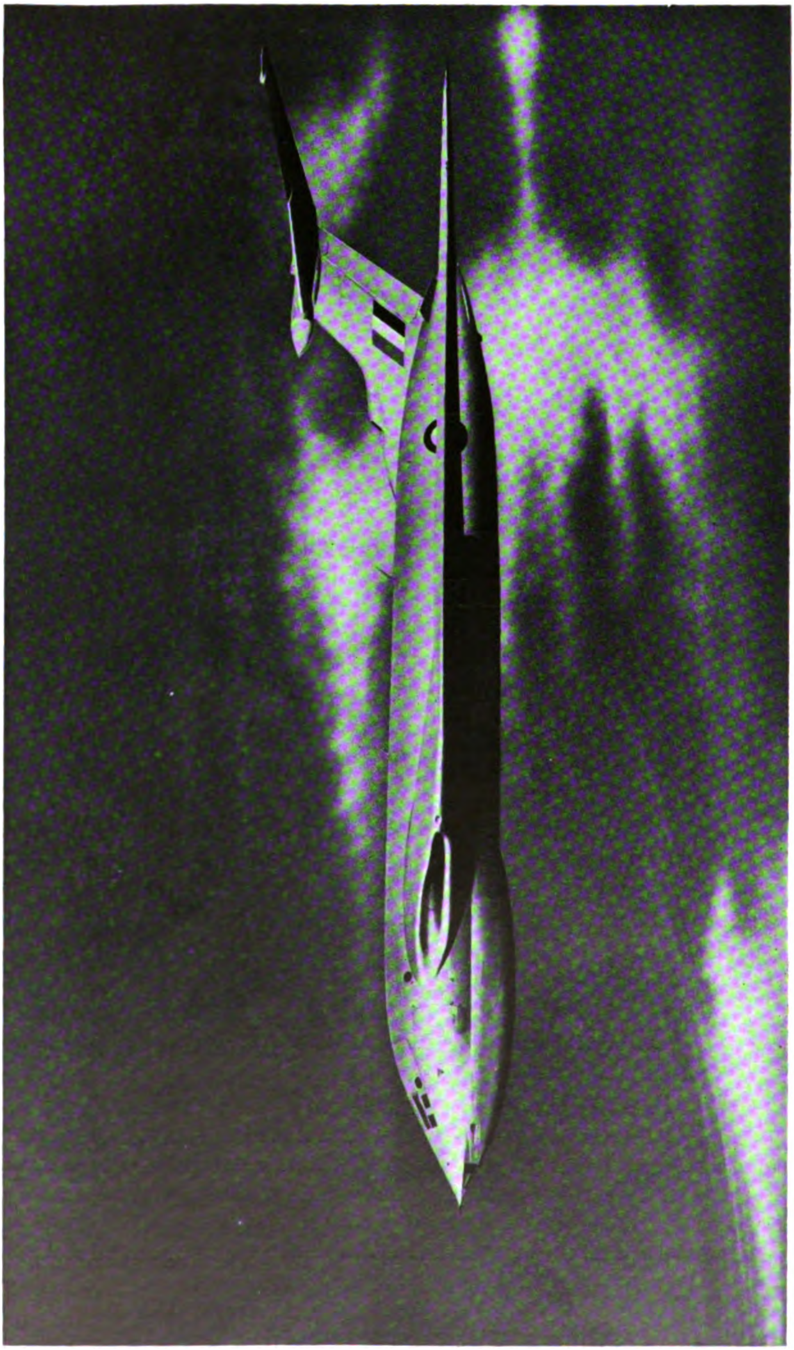
* *As in the House of Lords on 22nd October, 1953.*—EDITOR.



*Nowadays, only the bomber force can give us **any** hope of fighting the air battle over the enemy's territory rather than over our own . . .*

AIR POWER—AIR MASTERY

By Air Marshal Sir Robert Saundby, K.B.E., C.B., M.C., D.F.C., A.F.C.

SIR WINSTON CHURCHILL, speaking at Boston, Mass., in 1949, said: "For good or ill, air mastery is today the supreme expression of military power, and fleets and armies, however necessary, must accept a subordinate rank."

"Air mastery" is the main business of air power, and my object in this article is to attempt a brief analysis of air power, and to indicate the way, the only way, in which it can achieve air mastery. I shall also try to assess, very broadly, the relative importance of the main components of our defence organization, if it is to meet the conditions of modern warfare.

Lord Trenchard, in his message to the first number of Air Power, pointed out "that you can have air forces without having air power." In this striking phrase he spotlights what seems to me to be a point of outstanding importance, and one which is very generally misunderstood.

The principal agent of air power is the bomber force, with particular emphasis on the long-range bombers capable of carrying weapons of mass-destruction to any part of the world. It is this force, and this force alone, that can deter the aggressor and prevent the "cold war" from becoming a "hot" one, and this force alone which, if war should come, can hope to win it for us. I do not suggest that the bomber force would enable us to win such a war by its own unsupported action—though it might possibly do so—but it alone can win the air battle, and once the air battle is won the way is clear for final victory. And only a bomber force can create, as it did in the Second World War, a situation of general air supremacy in which such operations by land and sea, as may be needed to complete the enemy's defeat, can be successfully carried out.

In the days when we depended on sea power for our security, our battle fleets could be relied on to keep a war, if it should come, away from our shores. Nowadays, only the bomber force can give us any hope of fighting the air battle over the enemy's territory rather than over our own. As Lord Trenchard put it, in the debate in the House of Lords on 22nd October, 1953: "If the enemy are ready to hit us in our land and we are not ready to hit them in theirs, the second Battle of Britain will be fought over our heads with the atom bomb and all that that means." Later in the same debate Lord Tedder, speaking of the air battle in the Second World War, said: "I wonder how many people realize that what we call the Battle of Britain . . . was really only the first round in that contest—dangerous and critical because it was in our skies and over our heads. How many people realize that when our days and nights got quiet, and the sirens were silent, it was not because the battle was over but because it had moved? And it moved because our Air Forces, late, but fortunately not too late, were building striking power and pushing that battle further and further away from our skies into enemy skies, until the Battle of Britain became the Battle of Berlin."

He went on to say that when the air battle over Germany had been won, "then it became possible not for the Air Force alone, but for the forces of sea, land and air, to sweep forward and gain a victory."

In these two quotations, in words far better than I could find, is set out the main object of air power, and the consequences of air mastery. The bomber force has taken the place of the battle fleet as the only force which can keep the war away from this country and win the battle, not over our own heads, but far away in the skies over the enemy's vital centres.

Why is it that this fact is not more widely recognized, and why do not our people insist on our possessing a supreme bomber force as formerly they insisted on the supremacy of our battle fleets at sea?

The answer is to be found partly in military conservatism, partly in widespread ignorance as to the way in which air power must work, and partly in the psychological distaste which so many people have for the whole idea of bombing from the air. There is also, I think, in some quarters a foolish hope that if we do not bomb the enemy he can be relied upon not to bomb us. This last, of course, is an attitude of mind that leads directly and inevitably to defeat.

Whatever the reasons, however, it is quite clear that if we are to survive we must accept the truth of Sir Winston Churchill's statement. What is more, we must realize the consequences that flow from that acceptance, and the need to revise our conceptions of defence in this atomic age.

The money which we can allocate to defence without injuring our economy is limited, and will always be much less than is needed to insure against every possible threat to our security. But nothing is more certain than if we attempt to be strong everywhere we shall end by being strong nowhere. This means that we must make up our minds what forces and weapons are indispensable to our security, and deny ourselves everything else. Armed forces and weapons are nowadays so expensive that we can afford nothing but the best. We certainly cannot allow ourselves to maintain out-of-date forces because of a sentimental admiration for their splendid traditions, or because it cannot be denied that in certain circumstances they might possibly prove to be of some use. History shows that obsolete forces and weapons have been retained because no one can truthfully say that, in every possible eventuality, they would be 100 per cent. useless. And how often are the master weapons of the future delayed and neglected, because—although they can do far more—they cannot do everything that the older weapons could do, and in exactly the same way.

Progress is impossible without some sacrifices. The old sailing ships-of-the-line did not depend upon a limited supply of fuel, as does the modern steam-driven warships. And at an Army conference in the middle twenties I heard a distinguished General say that he much preferred the horse to the petrol engine as a prime mover for military transport, because you could make a horse go on for miles when it was hungry and thirsty, whereas a petrol engine would stop dead when there was no more petrol in the radiator! Nevertheless, in spite of prolonged opposition, sails were superseded by steam as the motive power of warships, and the transport of civilized armies no longer relies upon the horse.

It is a major fortune that the Air Force has so far failed to convince the two older Services that it is air power—in the form of bomber forces—which alone can create the conditions necessary for their success. Although they do now generally accept the need for air supremacy, they find it hard to believe that it can be achieved only by means of distant battles in skies far beyond the range of their sight and hearing. They prefer to think, quite wrongly, that it can best be gained by close support forces fighting over their heads.

Consequently, the Army and Navy show little enthusiasm for the bomber force, though it is relatively easy to obtain their support for fighter defences, tactical air forces, aircraft for anti-submarine and anti-shipping operations, air-sea mine-laying and air transport. In short, they will give their blessing to all forms of air forces except the long-range bomber force, which alone can provide real air power.

I do not want to be misunderstood; all these forms of air forces are valuable and in some circumstances indispensable. But all are worthless if there is no bomber force to win the air battle, and thus create the conditions which alone can make victory possible. To draw an analogy from the Navy in the days of two-dimensional warfare, the battle fleet alone could provide real sea power, and if it did not exist or had been destroyed, all other sea forces would be worthless.

With the older Services failing to recognize the vital importance of the bomber force, there is a danger that the Ministry of Defence, following the line of least resistance, will tend to devote more and more money and effort to the provision of air forces rather than air power; a process which, if carried beyond a certain point, must have a fatal effect on our capacity to defend ourselves. It is literally true that we could spend £1,600 million a year on defence and yet, if we had no adequate bomber force, all this might avail us nothing. Without air power we could never keep the war out of our skies, nor could we create the situation which alone could open the way to final victory.

It cannot therefore be too often emphasized that air mastery—the supreme expression of military power, the only key to victory in modern war—is the business of the bombers. Without a bomber force, air mastery is impossible; without air mastery, victory is impossible.

It is therefore clear that the provision of a powerful bomber force, equipped with the best possible aircraft and superbly trained, must have first priority among our defence forces.

But there remain two other threats of so serious a nature that suitable provision against them is indispensable to our security. The first is the threat of sudden overwhelming air attack on our vital centres. We must have a sound, well-equipped air defence system to guard against this, or we might be reduced to impotence in a few hours before we had a chance to carry the air war into the enemy's skies. But our air defence, important though it is, must never be allowed to grow to the point at which it weakens our bomber force. Here is room for great ingenuity; for new radar techniques, guided missiles—air-to-air and ground-to-air—and a great incentive to maximum efficiency and economy.

The second threat is that to our sea communications. We are just as dependent, in these days, on our sea communications as at any time in our history, and they are more vulnerable than ever before. Shore-based aircraft, escort carriers and anti-submarine and anti-aircraft warships are needed, to ensure the safety of our convoys in the wide ocean spaces. The latter will be the Navy's sole task in the future, and it is one to which they will need to devote all their resources if they are to succeed.

But this threat, though deadly, could have only a gradual effect. The destruction of merchant tonnage more rapidly than it could be replaced must eventually bring us face to face with starvation and defeat. But it would be in the nature of a slow strangulation, and we should have time, as in both world wars, to rectify our mistakes and build up our organization. So this peril, though a very real one, does not present itself with the same brutal urgency as does the peril of air attack.

Turning to land forces, we must obviously have sufficient troops to prevent certain key points overseas from being overrun, and to reap the fruits of the victorious air battle. But we certainly do not need, nor can we possibly sustain, great armies on the scale of 1914-18. We do not even need armies on the scale of 1939-45, for, as Major de Seversky has pointed out in his latest book*: "Even if we could generate armies of the necessary size, we could not land them or transport them to the battlefields before the enemy was denuded of his air strength. But when he is thus denuded, there is no longer any need for mile-by-mile surface struggle." We shall not see again our armies taking part in long-drawn-out struggles between vast land forces in Europe, Africa and Asia.

I believe therefore that we must use every endeavour to reduce our military commitments. It is fantastic that we should be providing (and next year paying for) four British divisions to defend the Germans, while they devote their resources, free from any responsibility for their own defence, to competing with us in our vital export trade. It is equally fantastic that we should maintain some 70,000 men, in the cramped area of the Canal Zone, for the ostensible purpose of defending the Suez Canal. One may well ask what is the purpose of defending the Suez Canal, if our shipping cannot use the Mediterranean Sea. We could not use that sea in the last war, and it seems to me in the highest degree unlikely that we should be able to use it in any war against the Soviet-Communist Empire.

We have been manœuvred by events into the maintenance of a far larger army than is really required, either for the purposes of Imperial defence, or for the fulfilment of our obligations as a member of the North Atlantic Treaty Organization. It is imperative that our commitments overseas should be reduced, and a much larger proportion of our defence expenditure channelled into the three elements that really matter to our security: the bomber force with which to gain air mastery, and the two defensive shields, air defence and the protection of our sea communications.

I hope that no soldier, reading what I have written, will allow himself to think that I am "attacking the Army." It is most important, at this crucial stage in our development, that we should be free objectively to re-examine the structure of our defence organization, without its being construed as an "attack" on this Service or on that. Our defence organization will not be healthy unless we look at it from time to time with a critical eye, prune out the dead wood, and foster the new growth.

It is inevitable in the world of military affairs that new weapons and new techniques should change the practice, though not the principles, of warfare and modify the responsibilities of the fighting Services. The Army, once the only fighting force, has seen the development of ships of war and, in this country, the gradual emergence of the Navy as our first line of defence. The Navy, though much younger than the Army, and in a sense the child of the Army, has become the "Senior Service." Now the Air Force is the first line of defence and though also, in a sense, the child of both the Army and the Navy, it has already reached the position where, to repeat the quotation with which I began, "air mastery is the supreme expression of military power, and fleets and armies, however necessary, must accept a subordinate rank."

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* *Air Power: Key to Survival.*

JET-AGE NAVY

BY JOHN W. R. TAYLOR

WHEN General "Billy" Mitchell's small force of Martin bombers sank the old German battleship *Ostfriesland* in experiments off the mouth of the Chesapeake in July, 1921, they sowed the seeds of an intense inter-Service rivalry that has been a bugbear of U.S. military planning ever since.

If the tests, and those carried out in Britain two years later with the radio-controlled battleship *Agamemnon** had been analysed properly, the results would have been of immense value to both America and Britain. Recognizing the menace of air attack on their surface warships, the U.S. Navy might not have been so ill-prepared at Pearl Harbour, and the Royal Navy might not have risked sending the *Prince of Wales* and *Repulse* within range of Japanese shore-based torpedo-bombers, without adequate fighter cover, on 10th December, 1941.

Nor should those words "without adequate fighter cover" be overlooked. The U.S. "bomber boys" in 1921 chose to ignore the fact that the warships they sank so easily were defenceless. Results might have been very different if the sky had been filled with anti-aircraft fire from the ships, if they had had a squadron of fighters to protect them, or even if the weather had been bad. In February, 1942, we had striking proof of the difficulty of air attack in such conditions when the German warships *Scharnhorst, Gneisenau* and *Prinz Eugen* dashed to safety through our own English Channel, in the face of the most determined and courageous opposition by the Royal Air Force and Fleet Air Arm.

In other words, and despite thirty-two years of Air Force *v*. Navy controversy, Billy Mitchell's 1921 experiments did *not* prove that bombing had condemned Naval power to extinction, but only that air power was rapidly becoming the dominant factor in sea, as well as land warfare. The best way of providing that air power in mid-ocean remained, remains and will remain for some years by the use of carrier-based aircraft.

THE NAVY'S ROLE IN WAR

If the more extreme proponents of air power had had their way in the 1920's and 1930's, there would have been no effective Naval power at the outbreak of war in 1939. How, then, could Britain have survived the U-boat blockade? It was not until 1943 that we had long-range aircraft able to patrol the vital mid-Atlantic, and if we had not been able to protect our convoys with hastily built escort carriers and hastily converted merchant carriers, our life-line of food and supplies would have been severed. Even in the final analysis, when shore-based aircraft had played a major part in the Atlantic battle, 341½ U-boats had been sunk directly by ships and ship-borne aircraft, compared with 245½ by shore-based aircraft, 63 in bombing raids and 16 by Naval mines laid by shore-based aircraft.

Today, we rely as much as ever on our supplies from overseas, and our only potential enemy has a large and powerful submarine fleet. In war time, those submarines would be dangerous only when near our supply ships, and the most

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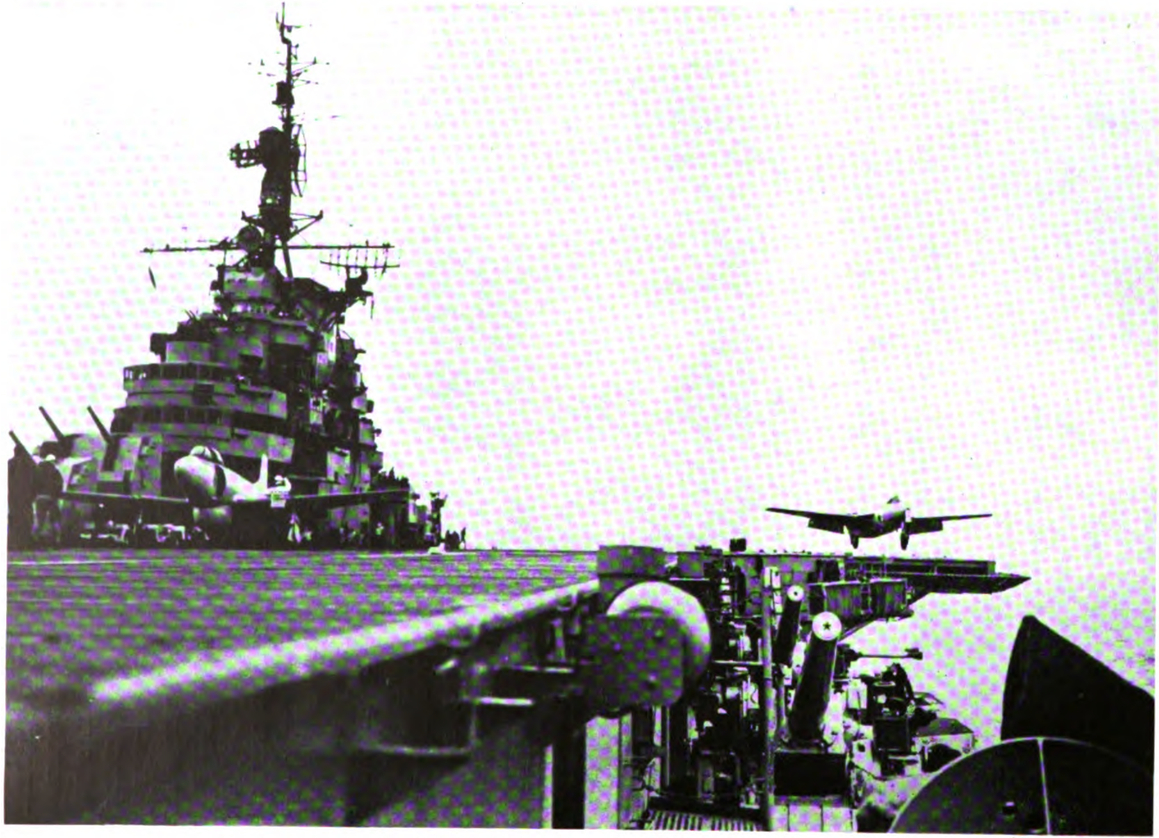
*For a description of these experiments see pp. 92-93 of "Perchance," by B. J. Hurren, published by Nicholson & Watson.



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A Hawker Sea Hawk (right) and a Vickers Attacker (left).

efficient and economical way of providing close protection for convoys is with specially developed anti-submarine aircraft, flown from a carrier in the convoy. Does it make sense to send a landplane 1,000 miles, perhaps in bad weather, to try to locate a convoy in mid-Atlantic, so that it can fly around for an hour or two before travelling another 1,000 wasted miles home?

Then again, how could we have landed immense armies in Europe in the summer of 1944 without the shield and strength of the Royal Navy? How could the U.S. Air Forces have found bases for bombing Japan into submission if sea power had not landed the hard-fighting Marines and other troops on a score of enemy-held islands? Is there any doubt of the value of Naval artillery support before and after D Day in Normandy? Or of the superb achievements of British carrier-based aircraft in Korea, during which they fired 3,300,000 rounds of 20 mm. ammunition and 57,600 rockets, and dropped 15,200 bombs in support of United Nations' ground forces—even during the period when the Communists held all the airfields in North and South Korea?

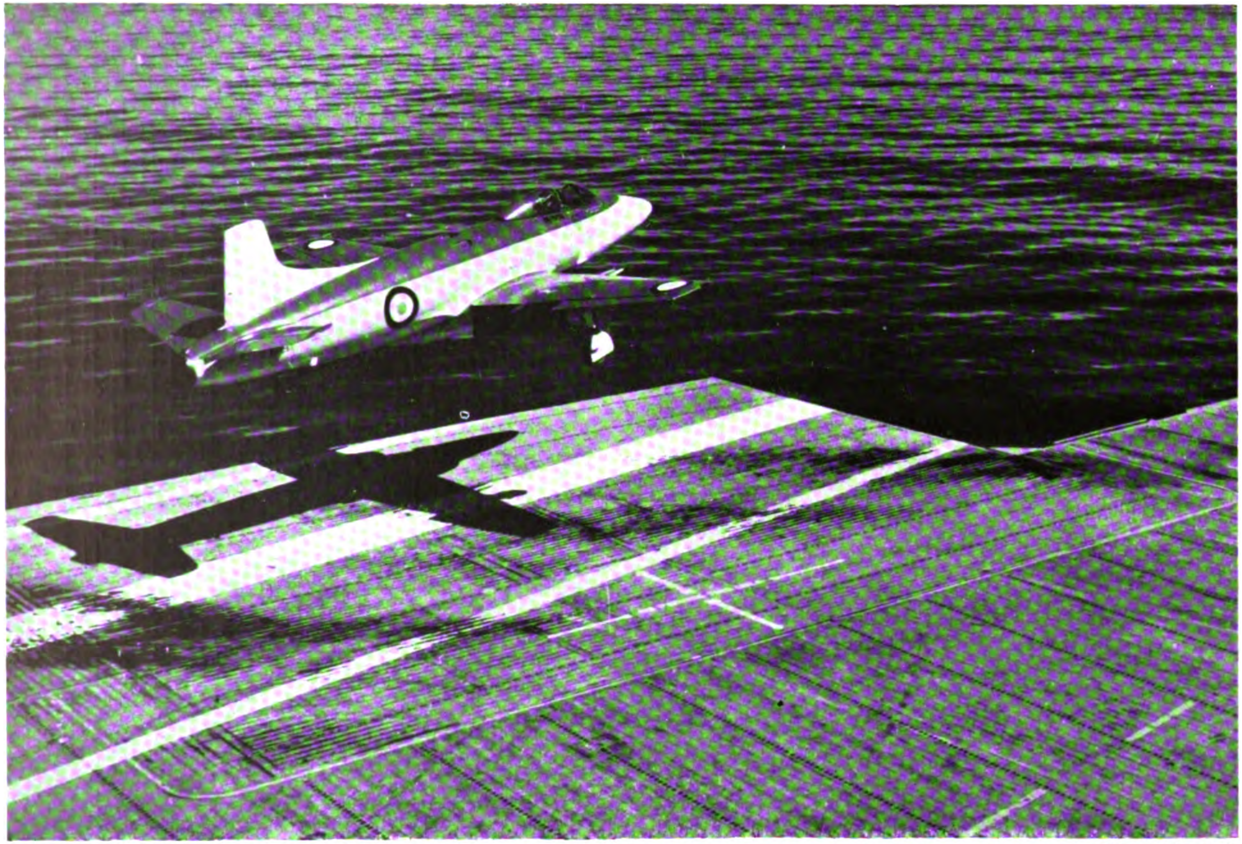
The air force supporters who claim that it would be suicide for Naval forces ever again to attempt such operations in a major war are surely doubting the ability of air power to protect its own bases. Is the aircraft carrier, moving at thirty knots, so much easier to hit than a two-mile-long, 300-yard-wide concrete runway? When the British carriers *Indefatigable* and *Victorious* were hit with devastating force by Japanese *Kamikaze* suicide aircraft in the Okinawa campaign, did they not prove their toughness by returning to the offensive within two hours of being attacked? As Admiral Horan emphasized in the October, 1953, issue of AIR POWER, only eight of the fifty-eight carriers used by the Royal Navy in the Second World War were sunk, only one of them by aircraft, and there has never been a case of a carrier base being captured and used by the enemy.

THE SINGLE SERVICE FALLACY

Jet propulsion and the atomic bomb have not changed the over-all picture as much as some of their noble lordships who took part in the Air Forces debate in the House of Lords on 22nd October last would have us believe. The atomic bomb could not win a war by itself. To start with it has to be delivered to its target, which means that the aircraft carrying it must have a base from which to operate and must be able to elude enemy fighters, missiles and gunfire over the target. The base might have to be captured; would certainly need to be protected. Raw materials for some of the bomb's components would have to be brought from overseas and so it is vital to keep open our sea communications. All the transport aircraft in the world could contribute only a pitifully small percentage of the total supplies needed to keep a country like Britain alive and at work, even if our airfields were not put out of action by bombing. Remember that the total tonnage of freight handled at London Airport each year—about 15,000 tons—would hardly fill two good-size cargo ships.

In fact, there is no panacea weapon, and never will be. The responsibilities and equipment of navies, armies and air forces will need constant revision and modernization as new weapons are invented and new techniques devised, but it is unlikely that any one Service will ever become redundant.

The Admiralty has never failed in its duty and clear-sightedness in this respect. Despite proud tradition, its battleships have gone, and in their place we have a force of aircraft carriers, powerful new destroyers, frigates, submarines and other vessels, tailored to the Navy's jet-age duties, with the emphasis on anti-submarine operations. It is a small force, just as Bomber Command is small. But it is efficient and, like Bomber Command, will be as formidable as



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A VICKERS ATTACKER

any comparable force in the world when it gets its new equipment, still on order.

If anyone doubts that the Admiralty and the Royal Navy are capable of reconciling unrivalled fighting traditions with new problems of the jet and atomic age, let him remember that the two greatest modern contributions to carrier efficiency and safety—the steam catapult and angled deck—are British inventions, which have been adopted most enthusiastically by the nationalistic United States Navy.

THE STEAM CATAPULT

During the war, carrier-borne aircraft developed so fast that they were able to match the performance of their shore-based counterparts—a happy state of affairs that certainly did not obtain in 1939. It was obvious by 1945 that, to maintain this equality, the carriers would have to learn to operate jets. One of the major problems was that jets are "slow rollers." Unlike a piston-engined plane, the pilot cannot normally ram forward the throttle and get an immediate increase in power. So, as wing-loadings have increased steadily over the last decade, it was obvious that more powerful accelerators would be needed to get heavy, high performance jet aircraft into the air.

Unfortunately, the conventional hydro-pneumatic wire purchase type had reached its practical limit by 1945; something new was needed. The answer was provided by an R.N.V.R. officer, Commander (E.) C. C. Mitchell, O.B.E., of Messrs. Brown Brothers, of Edinburgh, who promptly designed and built a prototype catapult for installation on the light fleet carrier H.M.S. *Perseus*.

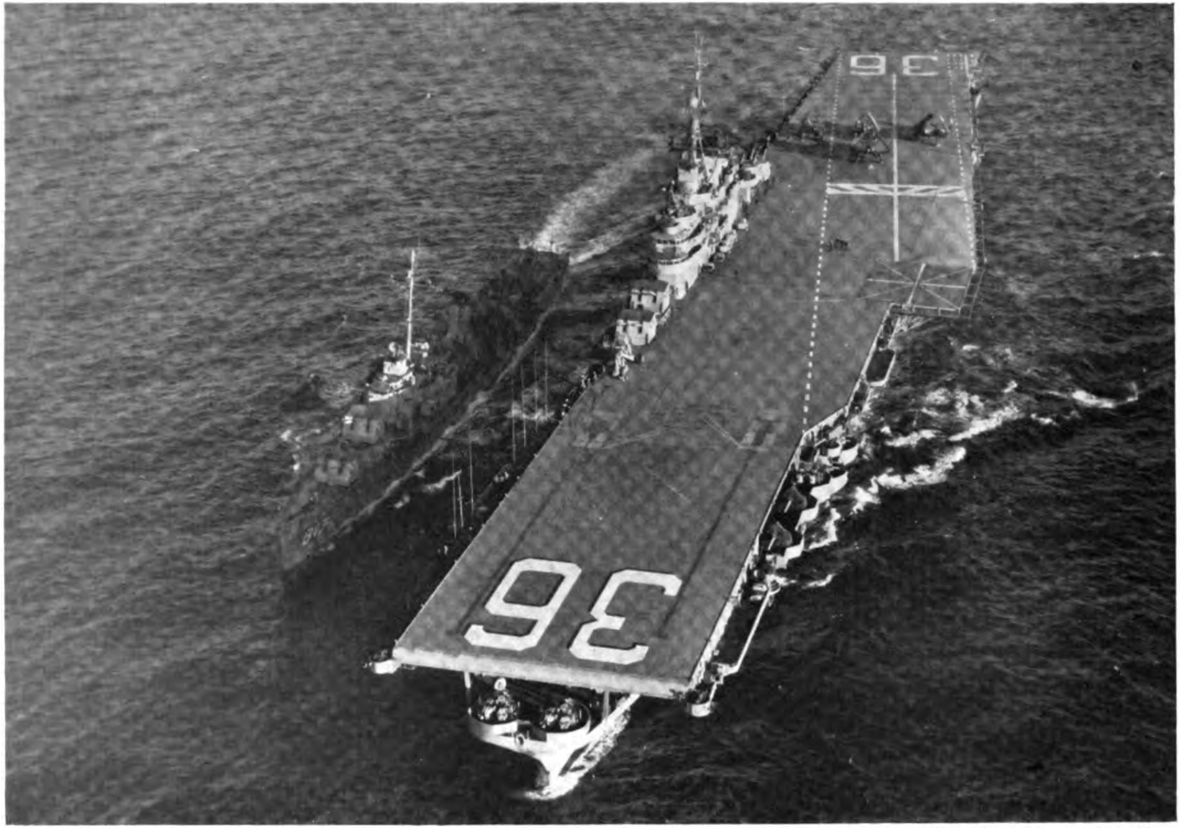
Nicknamed the "steam slingshot," it uses the principle of the slotted cylinder and has no rams or purchase cables. A hook on the aircraft to be launched is connected directly to a piston, which is driven along the cylinder by high-pressure steam from the ship's boilers. A novel sealing device keeps the cylinder steam-tight.

For first trials on H.M.S. *Perseus* the steam catapult was installed in a raised false deck, forward of the "island," with its compressors and machinery in the hangar. But when built into a carrier for operational use it will not require alteration of the level of the flight deck or interfere with the normal working of the ship below deck. It will be disposed about the ship, taking up less living and working space than the most powerful conventional catapult.

First tests were made in 1950, using dead loads of varying weights and construction. Later, pilotless aircraft with wing tips removed and locked controls, were shot off successfully, although one of them caused a little concern by circling the ship for four minutes before running out of fuel.

The first piloted aircraft, a Firefly, was flown off in July, 1951, by Lieutenant-Commander J. M. Glaser, D.S.C., R.N., Commanding Officer of No. 703 Service Trials Squadron, who was later catapulted successfully in an Attacker jet fighter. Other tests followed, with Sea Vampire, Sea Hornet, Sea Fury, Avenger and Sturgeon aircraft, after which *Perseus* sailed to America for demonstration to the U.S. Navy.

Tests at the U.S. Naval Shipyard, Philadelphia, the Naval Operating Base, Norfolk, and at sea in January-March, 1952, showed that the steam catapult could hurl the U.S. Navy's jet fighters into the air even when the ship was headed downwind or alongside a dock. The old problem of having to turn a carrier out of line in a convoy to launch its aircraft into wind was overcome, and the U.S. Navy at once decided to adopt it for their new carriers. Catapults will be sent from Britain until production can be started in America, and the first installation this year will be on the Essex-class carrier U.S.S. *Hancock*, which



[*Official United States Navy Photo*

U.S.S. "Antietam" refuelling U.S.S. "Corry" (DD 817) at sea in the Virginia Capes area during control deck evolutions.

is being completely modernized. Later, this British invention will be built into the U.S. Navy's 60,000-ton Forrestal-class flush-deck super-carriers.

THE ANGLED DECK

Meanwhile, British technicians had been busy solving another problem of jet operation from carriers. With piston-engined aircraft it has always been possible to use the forward half of the flight deck for accelerated take-off, even when other aircraft are landing on the rear deck. Any aircraft unlucky enough to miss the deck arrester wires when landing is caught by the crash barrier erected across the deck some distance forward of the wires. Unfortunately, crash barriers cannot always be relied upon to stop a ten-ton jet plane, coming in, perhaps with its flaps out of action, at over 100 m.p.h., without serious consequences for the aircraft and its pilot.

Many alternatives were studied. Then Captain D. R. F. Cambell, D.S.C., R.N., in collaboration with Mr. L. Boddington, of the Royal Aircraft Establishment, Farnborough, suggested the angled deck which, by the simple addition of a wedge-shaped extension to the port side of the flight deck, has the effect of increasing its length by forty per cent. The photograph (opposite) shows what it looks like.

To prove the practicability of the idea, the shape of an angled deck was painted across the normal flight deck of H.M.S. *Triumph*, without extending it past the side and without altering the arrester wires. Aircraft flew from it to test the visual problem presented to the pilot, and aerodynamic effects such as those resulting from wind flow round the "island" structure.

The tests were so successful that the Admiralty decided to incorporate the angled deck in the design of all future carriers. The cost of converting the Royal Navy's present carriers was considered too high to be justified. But, as part of the normal routine of Anglo-American collaboration, the U.S. Navy had been told all about the angled deck and they resolved to undertake the complete conversion of the U.S.S. *Antietam*, including the angled deck, angled arrester wires and flight deck extension. This explains why the Americans were first in the field with this British invention, which they call a "canted deck."

Although it does not improve the appearance of an aircraft carrier, the angled deck is perhaps the greatest contribution ever made towards increasing the efficiency and safety of carrier operations. If a pilot comes in to land too fast, or misses the arrested wires, he no longer finds himself hurtling towards a crash barrier or aircraft parked on the fore-deck. He merely has to open the throttle and fly on over the open angled deck for a second landing approach.

ABOARD THE U.S.S. "ANTIETAM"

Landings can be made quite happily with more than the usual number of aircraft ranged on the fore-deck. In action, jets can be catapulted off the fore-deck and piston-engined aircraft flown off the angled deck at the same time. We had an opportunity of seeing this done during the *Antietam's* recent visit to British waters, and it was most impressive. The ship was headed eight degrees out of wind so that the angled portion of the deck faced into wind. Big piston-engined Guardian anti-submarine aircraft then proceeded to demonstrate their incredible take-off performance by flying off the angled deck, whilst Panther and Sea Hawk jet fighters were catapulted off the fore-deck.

The angled deck's value was proved dramatically when the arrester hook of a Royal Navy Attacker jet-fighter snapped off as soon as the aircraft snagged an arrester wire. The best the pilot could have hoped for on an orthodox carrier would have been to end up surrounded by crash barrier and bent aeroplane. Instead, with great presence of mind, he rammed open his throttle and, being close to land, made for the nearest Royal Naval Air Station.

It is this sort of thing that enabled the *Antietam* to amass the incredible total of over 5,000 accident-free landings in the first six months of 1953. Of the pilots who made these landings, fifty had never flown a jet on to a carrier before, and thirty had never landed any sort of aeroplane aboard ship. In 115 cases they failed to catch an arrester wire first time, mainly because their hooks hit the deck too hard and bounced over the wires. Normally, every one of those 115 aircraft would have run on into the crash barriers and been damaged to some extent. As it was, they simply went round for another approach.

The U.S. Navy is already building angled decks on two more of its existing carriers, and the giant Forrestal-class ships will be built from the start with angled decks; so will the Royal Navy's H.M.S. *Hermes* and her sister ships.

THE NAVY'S AIRCRAFT

The steam catapult and angled deck represent the new look in aircraft carrier design. What of the aircraft that will fly from the new British super-carriers? Operationally they fall into four main classes: (1) the all-important anti-submarine hunter-killers, armed with a homing torpedo, of which the Royal Navy's Fairey Gannet will set the fashion for many years; (2) interceptor fighters to protect the fleet by day, represented by the superb 600 m.p.h. Hawker Sea Hawk and the forthcoming sweptwing Supermarine 525, most powerful single-seat fighter in the world; (3) two-seat night fighters, now the de Havilland Sea Venom NF.20 and later a Naval version of the D.H.110 supersonic twin-engined all-weather fighter; and (4) strike aircraft like the Westland Wyvern, with high speed and armament of guns, rockets and torpedoes to attack ship and shore targets.

Beyond these are the helicopters, already giving excellent service on plane guard and rescue duties and destined for a great future as beach assault transports and possibly anti-submarine aircraft. Further off still are fantastic vertical take-off rocket interceptors and anti-submarine, anti-ship and anti-shore guided missiles, which may completely change the shape of the aircraft carrier to a smaller, very fast launching platform or even a big atomic-engined submarine aircraft carrier.

But this is in the far-off future. Meanwhile, if we sacrifice the Royal Navy on the altar of false economy it will be like expecting Randolph Turpin to box with one hand tied behind his back. In any future war, we shall need both hands and a pair of feet, too. Above all, though, we need to keep our heads now, and not trust in panacea weapons, atomic or otherwise.

THE AIR FORCES IN PARLIAMENT

(*This article was completed on 31st October, 1953*)

BESIDES the Foreign Secretary's statement on Foreign Affairs, which was made in the House of Commons on 20th October, 1953 (the day on which Parliament resumed its sittings after the summer recess), the proceeding of latest and most interest to readers of this Journal was the debate in the House of Lords on "Britain's Air Forces," which took place on 22nd October, 1953.

Viscount Trenchard opened the debate by asking two very important questions: (i) "Whether Her Majesty's Government realize that a large economy could be secured by unifying the air forces of this country as in 1919" and (ii) "What steps Her Majesty's Government propose to take to appoint an outside committee so that a way can be found to shorten the time between the design of aircraft and their entry into service with the Royal Air Force."

The latter naturally met with general agreement—in principle—as all parties and individuals desire to reduce the time taken in the production of new types of aircraft, but the Secretary of State for Air, Lord De L'isle and Dudley, said that, while investigation by outside committees was very valuable in certain circumstances, it was not always necessary, that the responsible Minister should be the sole judge of its desirability in any particular circumstances, and that he would not hesitate to have a committee appointed for the purpose proposed if he thought it might help him to speed up production.

The former question, on the other hand, being obviously controversial, provoked a long and interesting debate which was carried on with restrained feeling on both sides. It involved no less than the handing over of practically all Naval aviation to the control of the Royal Air Force and the elimination, or reduction, of aircraft carriers. As this is a matter of the greatest importance, an attempt must be made to summarize here, even if only in a few pages, the main points of the speeches which took exactly three hours to deliver.

The question is, of course, an old one, and it was settled—for the time being, at any rate—in 1939, when the Fleet Air Arm was separated from the Royal Air Force and placed entirely under Admiralty and Naval control. But because it was then decided to restore to the Navy the control of all ship-based aircraft, that was and is no reason why the question should not again be raised for discussion, and Lord Trenchard seized the opportunity of raising it again two days after the House of Lords resumed its sessions.

He began by suggesting that "the Royal Naval Air Service, or the Fleet Air Arm as it is now called, and the Royal Air Force should be unified, and so revert to the position which existed in 1918," when the Royal Air Force was formed by the unification of the Royal Naval Air Service and the Royal Flying Corps. He briefly traced the development of our fighting forces from the formation of "local land forces" which were raised to defend the country and eventually became the Army. Then, he said, the circles of defence were extended, ships had to be employed, and these became the Royal Navy and Britain's first line of defence. With the further extension of the circles of defence outwards and upwards, the Air Force became predominant.

He next proceeded to question the future use of aircraft carriers. They had admittedly been valuable in the last war, but, he said, the circumstances of the last war would not be repeated in the next war, because "the atom bomb is now a fact and the hydrogen bomb is nearly a fact," while aeroplanes fly faster than sound every day and have doubled the distance they can travel and the height they can reach. It is true that the sea lanes must be kept open, for if they are not we perish, but "the sea lanes cannot be kept open by aircraft carriers—the most expensive, vulnerable and dangerous means of defence we can have today. . . . If these carriers go to sea, they are going to sea to be sunk" with all their complement of trained seamen and aircrews and all their valuable aircraft. We must, as is frequently said, but never too often, beware of planning for the next war solely on the experience of the last. We must be prepared to sacrifice preconceived ideas, much cherished sentiment and long-established traditions, if changing circumstances require such sacrifices, in the paramount and vital interest of the defence of our country.

In the First World War, warfare was largely kept away from our land, but in the Second World War the Battle of Britain was fought in the skies over our land, and if we are not prepared to hit the enemy decisively at very short notice, a "second Battle of Britain will be fought over our heads with the atom bomb and all that that means." It is rightly said that attack is the best form of defence. This is particularly apposite in present circumstances, when at least some attacking bombers will always be able to get through our defences and drop their atom bombs with devastating effect on our cities and other centres of population and industry. It is now generally admitted that there is no certain and absolute defence against enemy jet bombers once they have left their bases. There are, however, two ways in which their attacks may be prevented. One is by destroying them, and their bases, before they take off for raids over this country, and the other is by threat of immediate and devastating atomic reprisals, which would render such raids most unprofitable for the enemy. These two countermeasures could be executed only by our long-range bomber forces. "If our enemies are prepared with these weapons and we are not," said Lord Trenchard, "that will be the end. But if each side is prepared in the same way, then we have some chance . . . that both sides will see sense and that neither will use these deadly weapons. A strong air service offers the only chance of bringing this about."

Returning to the aircraft carriers, Lord Trenchard pointed out that if there were no carriers there would be no justification for a Fleet Air Arm; that all the resources which go into those large ships, for their manning and their equipment, for their maintenance and their protection, could be used for other purposes; that naval air staffs all over the world and at the Admiralty could be considerably reduced, as well as numerous training establishments; and that all this would effect a considerable saving which could be devoted to other and more effective measures of defence.

The Minister of Defence, Earl Alexander of Tunis, who spoke next, said that the whole question of Naval Air and whose responsibility it should be had been thoroughly gone into between the two World Wars by many committees. The decision of the Government of the day to transfer to the Admiralty the responsibility for the operation and administration of ship-borne aircraft in 1939 had been taken on the basis of certain conclusions reported by the Inskip Committee in 1937, and, he said, "to be perfectly fair, I think that our experience in the last war has shown the correctness of this decision."

He thought that Lord Trenchard had gone far beyond suggesting that all aircraft, whether carrier-borne or shore-based, should be operated by the Royal Air Force; and that he really meant there was no need for anything but shore-based aircraft. If that was Lord Trenchard's view, then he could not share it;

and he did not think it would find much support at the present time, whatever the future might hold in store. Moreover, "enemy land-based bombers have a combat range of hundreds of miles which can take them over vast sea areas to attack our shipping"; and "this threat cannot be countered by shore-based fighters, except over a comparatively small area of coastal waters, because of the short range of the modern fighters." Hence it is essential that our fleets and convoys should have their own local defence fighters with them at all times, so as to be ready when an attack is imminent; for it would take too long, in mid-ocean, for land-based aircraft to reach them, even if they could reach them at all.

Viscount Alexander of Hillsborough recalled the "blank centre spot in the Atlantic" in which it had been impossible to get air cover by shore-based aircraft during the anti-submarine campaign, and he doubted whether it would be possible even now. "At the present time," he said, "I do not see how, for a considerable period ahead, we can possibly do without the aircraft carrier. It will be needed in the joint task, with the long-range air force, of maintaining the sea lanes" which are vital to our island existence and to the security of the Commonwealth.

Viscount Cunningham of Hyndhope regretfully looked upon the first part of Lord Trenchard's motion as an attack upon the Navy and he proceeded gallantly to defend his Service. Towards the end of the First World War, he said, the Royal Navy had a strong and efficient air service. Then the Royal Naval Air Service and the Royal Flying Corps were amalgamated and all naval flying came under the Royal Air Force. After the First World War, aircraft carriers were rapidly developed; but while the ships were naturally under Admiralty control, their aircraft with their aircrews and aircraft maintenance personnel were under the control of the Air Ministry. There was constant friction between the Admiralty and the Air Ministry, and this anomalous arrangement was found to be unworkable. Consequently the Government decided that all sea-based aircraft, i.e., those borne in aircraft carriers, should be placed under the control of the Admiralty, and this decision took effect early in 1939, as the Minister of Defence had said. This was only just in time. The outbreak of war in September, 1939, found the Fleet Air Arm efficient and pretty well trained, though its aircraft were "sadly indifferent."

Lord Trenchard wished to do away with aircraft carriers, but in his (Lord Cunningham's) view carriers were an important part of the Fleet for many reasons. Lord Fraser of North Cape, in the debate on 16th April, had set out clearly the case for the carriers. For the defence of convoys particularly the defence force must be on the spot; there is no time "to call up forces from afar." Lord Cunningham also questioned the vulnerability of carriers. No British carriers, he said, had been sunk by shore-based aircraft and only one by Naval aircraft. If it were said that the atom bomb had altered all this, he doubted "whether it had altered very much at sea"; and he looked confidently to the Royal Air Force, in their development of the guided and homing missile, to restore the balance between the attacker and the attacked.

Finally Lord Cunningham of Hyndhope put in a counter claim for Coastal Command to be placed fully under Admiralty control, as it had been under their operational control during the war.

Lord Brabazon of Tara said that guided and homing missiles would in future be directed against ships and the "aircraft carrier with all the eggs in one basket would be in a bad way." He compared the number of enemy vessels destroyed by the Fleet Air Arm in the Second World War with those destroyed by shore-based aircraft, to the great advantage of the latter, and he hoped the Minister would look at the figures and base his decision on that experience.

Lord Teynham also recalled the unfortunate experiences of the Fleet Air Arm under the Royal Air Force control. The last war had proved that surface ships were nothing like so vulnerable to shore-based bombers as some airmen had prophesied, and he thought that the same would hold good for the next few years at least. He insisted that the Fleet Air Arm is a specialized service and should be manned by Naval personnel. He also supported Lord Cunningham of Hyndhope's suggestion that Coastal Command should be placed under Admiralty control.

Lord Howe said that in the next war we should have to meet not only a terrific air attack but also a submarine attack of unparalleled magnitude. The question of the responsibility for Coastal Command had long been exercising the minds of Naval persons, but they had not pressed it because co-operation between the two Services had been so good.

Lord Douglas of Kirtleside found the wording of Lord Trenchard's motion "slightly ironical by the time he had finished his speech." His method of unification apparently involved the abolition of aircraft carriers and with them the Fleet Air Arm. That was a possible solution and one day might be the right solution—but not at present. He, with others, would leave well alone. The Fleet Air Arm manned and controlled by the Navy was a convenient arrangement that had proved itself in war. As to carriers, he saw no further use for the big fleet carriers, but when the defence of convoys was considered there was clearly justification for escort carriers manned by Fleet Air Arm personnel under Naval control. He was firmly of the opinion that Coastal Command should remain with the Royal Air Force, but that it should be under the operational control of the Admiralty—at least in war—as it had been when he himself was its Commander-in-Chief.

Lord Tedder, as usual, poured oil on the (slightly) troubled waters. He pointed out that the proper and most effective exercise of air power, like that of sea power, is carried out unseen except by the enemy and our aircrews or ships' crews; and that the first principle of air strategy was to carry the air war into the enemy's country. He supported Lord Trenchard's motion because he felt that "this renewed segregation of Naval flying was unnecessary and unwise. It involved an attempt—an attempt that fortunately failed—to destroy the unity, and thereby reduce the strength, of Britain's air power. To that extent he regarded it as reactionary." Yet he was not quite so concerned about it as Lord Trenchard was, because the younger generation of all three Services had learned to co-operate fully with one another.

After the Secretary of State had replied, mainly on the second part of the motion, Lord Trenchard said he had found the debate very interesting. There had been, he said, "two speeches which introduced perhaps a little acrimony into the debate." He could hardly be surprised at this when he had deliberately proposed taking away from the Navy all the biggest ships which remain to them.

R. F. P.

THE COMMONWEALTH AIR FORCES MEMORIAL AT RUNNYMEDE

TO THE MEMORY OF 20,455 MISSING AIRMEN AND AIRWOMEN

"Eternal rest give unto them, O Lord,
and let perpetual light shine upon them!"

MEMBERS of the Commonwealth Air Forces who lost their lives in air operations based on the United Kingdom and North-West Europe and have no known graves now have a worthy memorial, which was unveiled by Her Majesty The Queen and dedicated by the Archbishop of Canterbury on 17th October, 1953, in the presence of some twenty-five thousand of the relatives of the missing.

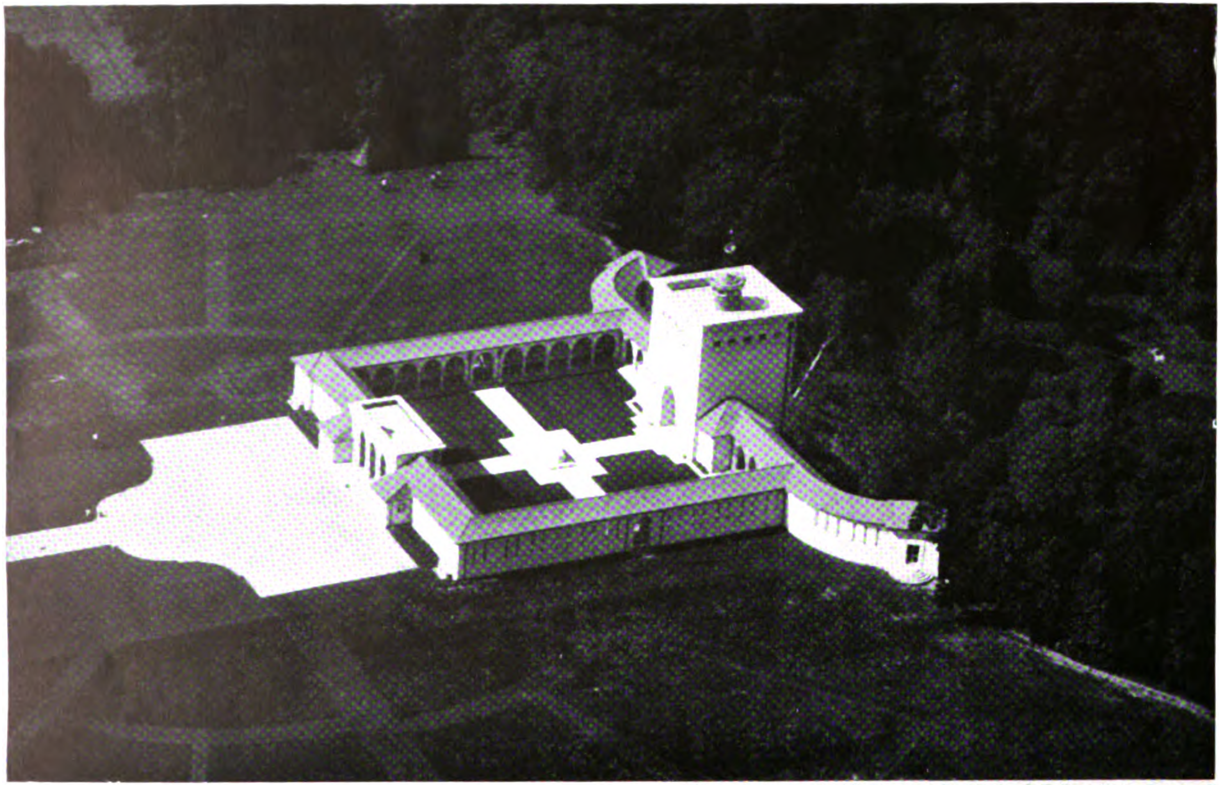
It stands upon a wooded spur of Cooper's Hill, overlooking Runnymede and the River Thames, about four miles from Windsor, on a site presented by Sir Eugen and Lady Effie Millington-Drake, in 1949.

The memorial, which is built of white Portland stone and roofed with blue-green Collyweston slates, consists of a central tower approached through a cloistered garth, in the middle of which rests the Stone of Remembrance.

Three arched doorways, side by side, form the entrance to the cloisters, and each doorway has double glass doors in heavy bronze frames with heraldic lions emblazoned on the glass panels. Set upon the cornice above the middle doorway is the badge of the Royal Air Force, in solid stone; and on the frieze below, in bold Roman capitals, is engraved the motto: *Per Ardua ad Astra.*

[Photo by Sergt. H. M. Quinton, R.A.F. Staff College Unit, Bracknell

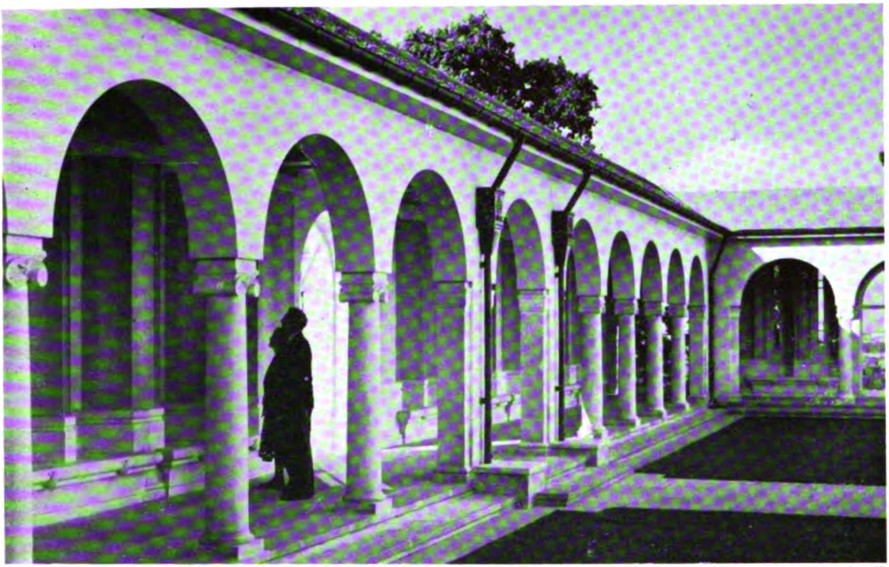
THE COMMONWEALTH AIR FORCES MEMORIAL AT RUNNYMEDE
The Main Entrance.



[Photo by Sergt. H. M. Quinton, R.A.F. Staff College Unit, Bracknell

THE COMMONWEALTH AIR FORCES MEMORIAL AT RUNNYMEDE

VIEW FROM THE AIR. The trees behind the Memorial are on a slope which falls steeply to Runnymede and the River Thames, so that the view northwards is uninterrupted.



[Photo by Sergt. H. M. Quinton, R.A.F. Staff College Unit, Bracknell

THE COMMONWEALTH AIR FORCES MEMORIAL AT RUNNYMEDE
Part of the Cloisters, showing Memorial Panels.

The cloisters, which surround the garth and extend in curved wings east and west of the tower, are divided into fifty-two bays, and each bay has two or three tall narrow windows set in its thick stone walls and embrasured on the inside like the loopholes of a medieval fortress. The names of the 20,455 airmen and airwomen here commemorated are inscribed on three hundred stone panels on the walls of the cloisters and in the embrasures of the windows. Coats of arms of the Commonwealth Countries to which these men and women belonged adorn the ceilings of the cloisters.

Facing the entrance, across the smooth green lawns of the garth, is the massive central tower. Three symbolic figures representing Justice, Victory and Courage stand, each on its own stone bracket, on the outer wall of the tower above its single arched portico. On the flat roof of the tower is a low turret bearing a crown and star upon a slender pole.

Inside the tower, at ground level, is a vaulted room or shrine designed for contemplation and recollection. The great window of the shrine looks northwards across the river to a peaceful prospect of cultivated and wooded plain. On the engraved glass of this window appear two angels holding a scroll on which are written the following verses of Psalm 139:

"If I climb up into heaven, Thou art there:
if I go down to hell, Thou art there also.
If I take the wings of the morning:
and remain in the uttermost parts of the sea;
Even there also shall Thy hand lead me:
and Thy right hand shall hold me."

Two alcoves, one on either side of the shrine, contain the printed Memorial Register. This register is arranged alphabetically and, as it contains fuller particulars than could be inscribed on the stone panels, it forms an essential part of the memorial.

The site of this beautiful memorial is singularly appropriate. It is close to the place where, seven centuries ago (in 1215), English barons forced the would-be tyrant, King John, to sign the Charter which is the foundation of our English liberties and of the democratic constitutions of all the Commonwealth countries.

The view from the balcony of the memorial is typical of English rural scenery at its best. Below the neighbouring woods lies Runnymede, a broad green meadow flanking the gently flowing Thames; Magna Carta Island is in the middle distance; and beyond, as far as eye can see, are woods, hedged pastures and arable fields, little grey churches, stately houses and small villages nestling in their friendly trees. Windsor Castle dominates the view to the north-west and London Airport can be seen far away to the north-east.

And the memorial itself, so ably designed by Edward Maufe, R.A., blends wonderfully with the landscape and is perfectly adapted to its purpose. Simple, dignified, full of grace and beauty, it cannot fail to inspire with reverence all who visit it.

The Commonwealth Air Forces Memorial at Runnymede will henceforth be a place of pilgrimage for relatives of those whose names are recorded on its memorial scrolls—and for countless others for whom also those men and women died. For relatives who live too far away to visit this hallowed spot, it will serve as a focus for their loving thoughts and prayers.

The memorial stands, above all, a silent but expressive witness that the memory of those who lie in nameless graves will be forever cherished in the heart of the Commonwealth for which they gave their lives.

AT RUNNYMEDE

(The Commonwealth Air Forces Memorial)

Loved airmen who, defending freedom, fell
And rest where none may heed,
Your memory shall ever dwell
At Runnymede.

Here in this peaceful English countryside,
Fragrant of earth and trees,
Where flows the Thames by ploughlands wide
And grassy leas.

Here, where the English forced a tyrant king
Oppressive rule to ease,
And framed the Charter whence do spring
Our liberties.

Here in this shrine, within its cloistered wall,
The pilgrim's thoughts shall pause
On those who, giving all, gained all
For freedom's cause.

Here, too, the thoughts of distant kith and kin
Shall fly, like homing birds,
To greet their loved and lost ones in
Unspoken words.

Beloved airmen, lost to sight and sound,
Whose graves no names do grace,
O, make this plot of hallowed ground
Your trysting place!

R. F. P.

U.S.A.F. ORGANIZATION IN THE U.K.

BY MAJOR-GENERAL FRANCIS H. GRISWOLD,
Commander, Third Air Force, U.S.A.F.

THE Headquarters for the United States Air Force in the United Kingdom is located at South Ruislip, Middlesex—the old Victoria Park Estate. The telephone exchange is Waxlow; the number 4300.

However, if a person should ring Waxlow 4300 and ask for any specific agency, say the Provost Marshal, that person would immediately be confronted with the query, "Third Air Force or 7th Air Division?"

A confusing situation. How is the outsider to know whether his business concerns an agency of the Third Air Force or the 7th Air Division?

Military organization the world over is a complex and confusing business. Each nation has its own concepts as to frugal utilization of manpower and equipment, and each nation has its own concepts as regards military organization.

As you have gathered, the United States Air Force has two major commands in England today, the Third Air Force and the 7th Air Division.

Logistically, the 7th Air Division is dependent upon the Third Air Force, but operationally the two are separate and distinct commands.

The Third Air Force is assigned to the United States Air Forces in Europe (U.S.A.F.E.), located at Wiesbaden, Germany, and commanded by Lieutenant-General William H. Tunner.

Third Air Force is charged with the logistical support of all U.S. Air Force units stationed in the United Kingdom, and the administrative responsibility of those units assigned to U.S.A.F.E. In the latter respect, Third Air Force has an essential role in U.S.A.F.E., S.H.A.P.E. and N.A.T.O. activities.

The 7th Air Division, commanded by Brigadier-General James C. Selser, Jun., belongs to General Curtis E. LeMay's global-striking Strategic Air Command. Its operations are under the direct and complete control of S.A.C. Headquarters, Omaha, Nebraska.

To fully appreciate both the alliance and the distinction of the two commands, one must recall the history of the U.S. Air Force in England since its return in the summer of 1948.

Not many military men are likely to forget that summer; to forget the international tensions of the time. It was the period of the Berlin blockade, the Iron Curtain, the Cold War. It was a time for action—immediate and positive action.

That action, much to the credit of all free nations, was humane action. Immediate and positive, but humane. It later proved an effective action, but in the summer of 1948 there was no reason to have complete confidence in its effectiveness.

For the second time in a decade, preparation became the international theme. The dark cloud of Fascism had passed, leaving in its wake the wreckage and debris of the Second World War, and already a second cloud was on the horizon.

In the interest of common defence, arrangements were formulated between the United States Ambassador, Mr. Lewis W. Douglas, and the office of the

LIEUTENANT-GENERAL LEON JOHNSON

First Commander of 3rd Air Division, now Third Air Force, present Commander of Continental Air Command, U.S.A.F.

Parliamentary Under Secretary of State for utilization of specific R.A.F. bases by U.S. Air Force crews for training and for the development of four bases in the Oxfordshire area to B-29 and B-50 standards.

The original U.S.A.F. command in the United Kingdom was the 3rd Air Division, commanded until May, 1952, by Major-General Leon Johnson (now Lieutenant-General, commanding the U.S.A.F. Continental Air Command).

The 3rd Air Division was to be the resident command and to provide logistical support of all U.S.A.F. units committed to the United Kingdom for training purposes.

As the months passed, the "Big Lift" defeated the Berlin blockade, but the mutual interest of common defence remained a foremost item on the governmental agendas.

The North Atlantic Treaty was drafted and signed. A mutual and lasting defence system was to be established. N.A.T.O. came into being. The 3rd Air Division became the Third Air Force and was assigned to the U.S. Air Forces in Europe, then commanded by Lieutenant - General Lauris Norstad. This development presented a two-fold mission. In addition to being the command headquarters for U.S.A.F.E. units stationed in the United Kingdom, the Third Air Force was responsible for the logistical support and administrative control of non-U.S.A.F.E. units temporarily in the United Kingdom on training status.

Strategic Air Command was the only command regularly dispatching bombardment crews to England for training purpose. The S.A.C. mission being what it is—the long-range retaliation arm—intensive and direct control of its units was essential.

In view of this requirement, it was decided that a new air division should be established in the United Kingdom for the express control of S.A.C. units on training assignment to England. This new headquarters would be a Strategic Air Command unit, and would be strictly operational.

Thus, in May, 1951, the 7th Air Division was organized as a S.A.C. agency in the United Kingdom. Major-General John P. McConnell, who had been deputy to General Johnson, commanded the new division until March, 1953. (General McConnell is now Director of Plans at S.A.C. Headquarters, Omaha, Nebraska.)

THE 7 A.D.-S.A.C. ORGANIZATION

MAJOR-GENERAL JOHN P. McCONNELL

First Commander of 7th Air Division, now Director of Plans at Strategic Air Command Headquarters, Omaha, Nebraska.

Strategic Air Command is without question the largest mobile Air Force organization in the world. Mobility is synonymous with readiness in the vocabulary of General Curtis LeMay, and S.A.C. is a "combat-ready" outfit.

"Rotational training" is a term peculiar to Strategic Air Command.

It is an economical training programme introduced by S.A.C. to provide its combat crews with constant and practised mobility. The visits of these crews to 7th Air Division bases in the Midlands and East Anglia also tests the ability of the "house-keeping" personnel to maintain a state of combat-readiness.

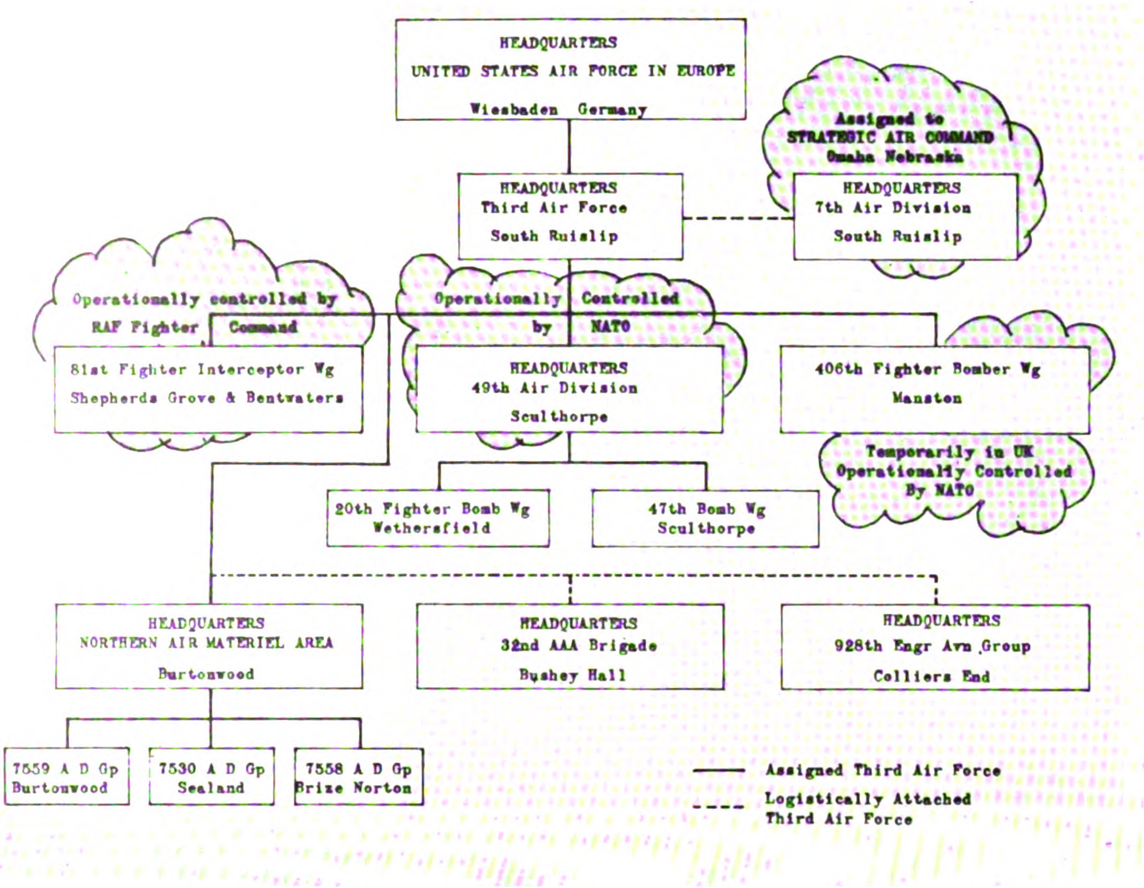
These "house-keeping" personnel, assigned to the Air Base Group (at lesser stations, the Air Base Squadron), are in the United Kingdom for three-year tours of duty. They provide support services for the combat crews on temporary training assignments. Such matters as administration, catering, medical and dental care, supply and related duties are their responsibility.

With this support already on hand at overseas stations, it is possible for the S.A.C. combat units to deploy from their bases in the United States with a minimum of accompanying non-crew-member personnel. Aircraft and maintenance crews, plus a few other specialists, are the only additional personnel usually accompanying the bombers.

Base personnel on 7th Air Division stations, while primarily concerned with meeting the support demands of the combat training crews, have a secondary role of vital importance to the over-all S.A.C. mission. At each of the installations, the station complement maintains sufficient stock items to enable any bomber unit of S.A.C. to operate with maximum combat effectiveness for a period of time long enough to establish a fully operative, continuing war-time supply system.

The first S.A.C. combat crews arrived in the United Kingdom in July, 1948. As one squadron or group completed a training tour lasting from three to six months in duration, it was rotated back to its home base and another unit came in.

The turnover has been such that many of the units now have returned to the British Isles for a second and even third time.


HEADQUARTERS
UNITED STATES AIR FORCE IN EUROPE
Wiesbaden Germany
Assigned to
STRATEGIC AIR COMMAND
Omaha Nebraska
HEADQUARTERS
7th Air Division
South Ruislip
HEADQUARTERS
Third Air Force
South Ruislip
Operationally controlled by
RAF Fighter Command
81st Fighter Interceptor Wg
Shepherds Grove & Bentwaters
Operationally Controlled
by NATO
HEADQUARTERS
49th Air Division
Sculthorpe
406th Fighter Bomber Wg
Manston
Temporarily in UK
Operationally Controlled
By NATO
20th Fighter Bomb Wg
Wethersfield
47th Bomb Wg
Sculthorpe
HEADQUARTERS
NORTHERN AIR MATERIEL AREA
Burtonwood
HEADQUARTERS
32nd AAA Brigade
Bushey Hall
HEADQUARTERS
928th Engr Avn Group
Colliers End
7559 A D Gp
Burtonwood
7530 A D Gp
Sealand
7558 A D Gp
Brize Norton
Assigned Third Air Force
Logistically Attached
Third Air Force

These are the longe-range bombers—the B-50 Superforts, the B-36 Convairs, the B-47 Stratojets. (The Stratojet is the bomber that made a 4 hr. 45 min. Atlantic crossing from Limestone, Maine, to Fairford, Gloucestershire—an average of 616 m.p.h.)

In addition to its bombers, S.A.C. often has reconnaissance aircraft, refuelling tankers, and F-84 Thunderjet long-range escort fighters in the United Kingdom for training.

As previously stated, this "rotational training" is economical. The combat crews are given overseas training in operations and mobility with a minimum of cost in manpower. The overseas bases, so necessary to the S.A.C. global mobility mission, are maintained in a state of operational readiness, with the "housekeeping" personnel serving an immediate support mission as well.

There, briefly, is the 7th Air Division. It is an operational headquarters; a unit of Strategic Air Command.

U.S.A.F.E. COMBAT UNITS IN THE UNITED KINGDOM

There are four combat-ready tactical U.S. Air Force wings "permanently" assigned to the United Kingdom. "Permanently" used in this sense does not have true meaning—it is a term used merely to identify those units not on rotational training status.

The 49th Air Division, which arrived in the United Kingdom in June, 1952, is located at Sculthorpe, in Norfolk. It is commanded by Brigadier-General John D. Stevenson, and consists of two wings—the 47th Bombardment Wing (Light), equipped with B-45 four-jet bombers, and the 20th Fighter-Bomber Wing, equipped with F-84 Thunderjets.

The B-45 Tornado is built by the North American Aircraft Company. The F-84 Thunderjet is a Republic Aviation fighter-bomber, proved in the Korean action as an ideal support plane.

The Tornados are stationed at Sculthorpe; the Thunderjets at Wethersfield, near Braintree, Essex, and at Woodbridge, flying from Bentwaters.

The 49th Air Division is linked operationally with Supreme Headquarters, Allied Powers in Europe (S.H.A.P.E.). Most of its operations are in the form of exercises co-ordinated through the Continental Headquarters, and these aircraft are often in the skies above Western Europe.

The 406th Fighter-Bomber Wing, stationed at Manston, near Margate, Kent, is another combat-ready wing, equipped with the F-84 Thunderjet. It, too, is controlled from U.S.A.F.E. Headquarters.

This control is exercised more over the 406th than over the 49th Air Division because the 406th originally was intended for a Continental station, and thus plays a greater role in the Continental exercises. It is temporarily based in the United Kingdom pending completion of a suitable N.A.T.O. base on the Continent.

The 81st Fighter-Interceptor Wing, equipped with the North American F-86 Sabrejet—another fighter tested and proved in Korea—is stationed at Shepherd's Grove and Bentwaters in East Anglia.

Commanded by Colonel Gladwyn Pinkston, the 81st Fighter-Interceptor Wing dovetails into the air defence mechanism of the United Kingdom.

Although assigned to the Third Air Force and U.S.A.F.E., the 81st Fighter-Interceptor Wing is under the operational control of R.A.F. Fighter Command, and its operational activities are part of R.A.F. Fighter Command's air defence readiness programme.

[Photo: Boeing Airplane Company

The KC-97 Stratofreighter services mid-air the B-47 Stratojet—newest of S.A.C's. bombers, which recorded a 4.45 hours crossing from Limestone, Maine to Fairford, Gloucestershire.

THE LOGISTICAL PICTURE

The heart of the logistical support programme for Third Air Force is the sprawling Northern Air Materiel Area, commanded by Brigadier-General Troup Miller, Jun.

Headquarters for the Northern Air Materiel Area (N.A.M.A.) is located at Burtonwood, near Warrington, Lancashire.

It is at Burtonwood that the largest of three supply depots is maintained.

At this time there are five groups located at Burtonwood—the 7559th Air Base Group; the 7559th Medical Group; the 7559th Supply Group; the 7559th Transportation Group; and the 7559th Maintenance Group.

In the U.S. Air Force the term "group" has a different meaning than in the Royal Air Force. The U.S.A.F. "group" is that command organization which ranks immediately higher than the squadron and may have one or more specialized squadrons under its supervision and control. The next higher command organization over the group usually is the wing. Climbing yet higher on the command ladder, we come to the air division, the numbered air force, the major Command (U.S.A.F.E. is the major command over Third Air Force) and finally, United States Air Force Headquarters in Washington.

Burtonwood was opened in July, 1948, as an in-transit depot for B-29 Superfortresses in the United Kingdom for 90-day operational training missions.

The 59th Air Depot Wing, which has since been deactivated as a wing and reactivated in the 7559th group series, arrived in September, 1948, and shortly afterwards was committed to providing 200-hour inspections for C-54 Skymasters of the Berlin Airlift. From November, 1948, through October, 1949, the 59th accomplished 1,584 200-hour inspections.

At the end of the Berlin Airlift, the 59th at Burtonwood began concentrating on support of the 3rd Air Division bases in the United Kingdom.

As the influx of U.S.A.F. personnel to England increased with the organization of the 7th Air Division, Burtonwood developed a transportation group—a motor-transport group—to cope with the growing transportation problem. This is a unique organization in the Air Force structure. Not many numbered air forces in the U.S.A.F. boast a transportation group—ranging from quarter-ton jeeps to the five-ton M-52 truck-tractors.

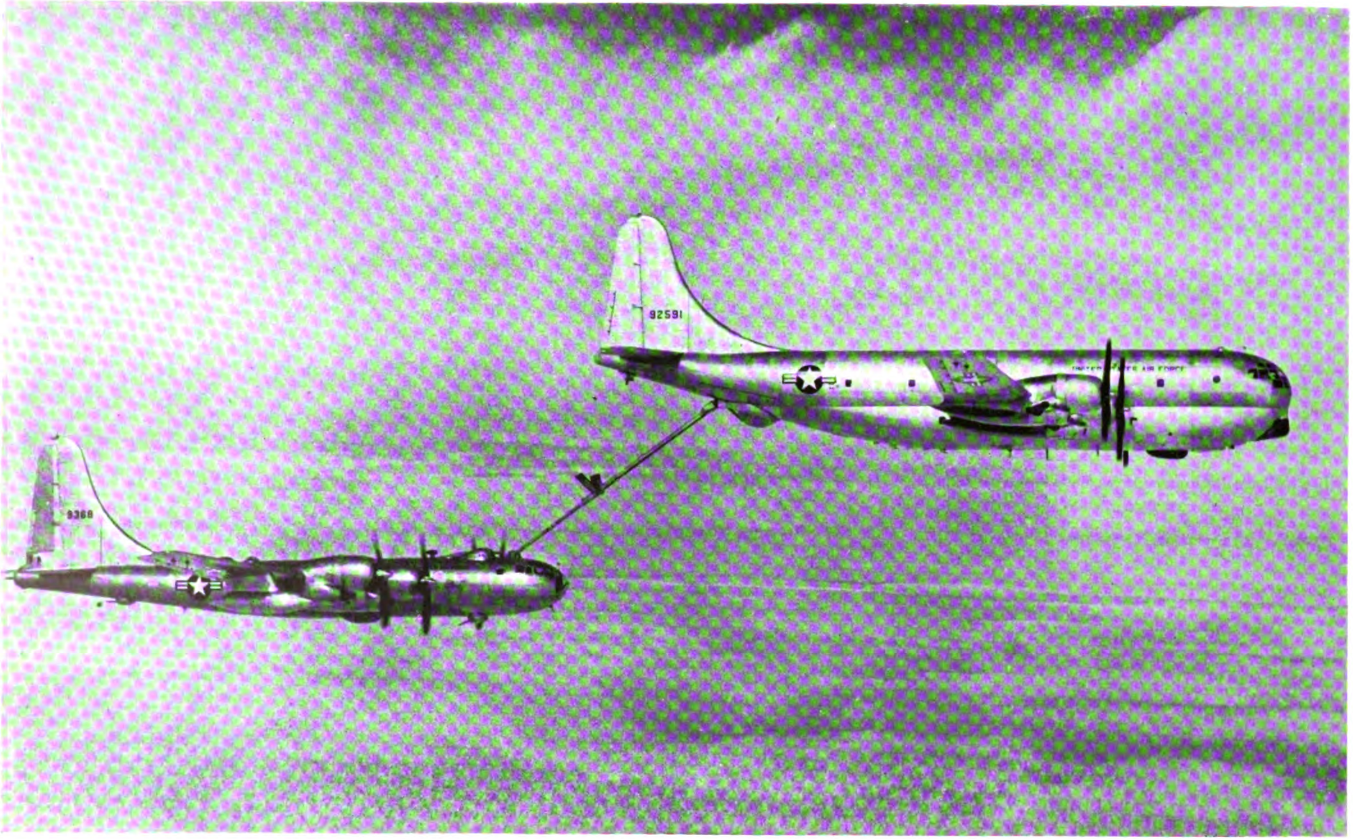
Burtonwood serves as a major supply centre, a central transportation agency, and as an aircraft and vehicle maintenance depot. While it is the largest and the major logistical support centre, it is not the only depot in the British Isles.

At Sealand, near Chester, Flintshire, the 7558th Air Depot Group, controlled by N.A.M.A., operates a specialized depot. It is at Sealand that publications, medical supplies, certain items peculiar to Army needs, plus commissary and Air Force Exchange Service stocks are channelled. The A.F. Exchange Service is the U.S.A.F. version of N.A.A.F.I.

In the Midlands, in the heart of the bomber base area, at Brize-Norton, Oxfordshire, the 7530th Air Depot Group maintains a bomber base supply depot. Stocks at this depot are primarily those peculiar to the needs of bomber aircraft maintenance and support.

ATTACHED ORGANIZATIONS

Attached to the Third Air Force for support purposes are the 32nd Anti-Aircraft Artillery Brigade of the United States Army, and the 928th Engineer Aviation Group, also a United States Army unit, but on duty with the Air Force.



[Photo: Boeing Airplane Company

The KC-97 Stratofreighter, a Strategic Air Command refuelling plane, refuels the B-50 Superfortress.

The 32nd A.A.A. Brigade, commanded by Colonel M. W. May, has its Headquarters at Bushy Hall, Bushy, near Watford.

As its name indicates, the 32nd is basically an anti-aircraft organization. Its four battalions are located in East Anglia and the Midlands. The 32nd A.A.A. Brigade has profited from valuable training through joint exercises with units of the War Department.

At each U.S.A.F. installation in the United Kingdom, the Base Commander is charged with effecting a base defence plan. These plans are so established that each person permanently assigned to the installation has an alert station. At a given signal personnel draw firearms, other necessary equipment and supplies, usually stored near the work section, and report to their assigned stations.

Through the War Department, joint exercises have been conducted to test the effectiveness of our base defence plans. British parachute troops on a number of occasions have attempted penetration on our bases. This programme has given our personnel a test mechanism, and at the same time has provided operational exercises for British reserve forces. Such tests are normally conducted at week-ends.

The United States has no infantry or other basic ground forces stationed in the United Kingdom; therefore, the sustained defence of its United Kingdom bases is a British Army responsibility.

In addition to the normal anti-aircraft components, the 32nd A.A.A. Brigade has several smoke-generating companies in the United Kingdom. Through constant practice exercises, these companies have proved their ability to completely obscure an air installation within a matter of minutes. This is not a new defence measure by any means, but it remains an effective one.

The 928th Engineer Aviation Group was brought to the United Kingdom from the United States in the late spring of 1950. The urgent requirement to extend and strengthen R.A.F. station runways to accommodate American bombers was such that the British Government, in view of a then critical labour and equipment shortage in the construction field, and after consulting the labour unions, consented to use of the Engineer Aviation battalions at the four Midlands bases.

So, the 928th arrived fully equipped with bulldozers, earth-carriers, power-shovels and other heavy equipment essential to fast construction activity. Since completion of the expansion work at those bases, the four battalions have been shifted to other bases for similar work. They are now being used at Chelveston, Stansted-Mountfitchet and Molesworth.

Commanded by Colonel Gerald McCarthy, the unit is assigned for administrative purposes to the 7th Engineer Aviation Brigade, headquarters of which is in Germany.

By agreement with the Air Ministry, the Engineer Aviation battalions have been concerned only with expansion projects on the airfield itself, such as runway, taxiway and hardstand construction. The B-29 and B-50 aircraft require a minimum 8,000 feet of runway. The new B-47 Stratojet needs at least 10,000 feet.

The Air Ministry approval of such projects is understandable, since the U.S.A.F. are merely tenants of the bases and, like all tenants, must obtain the landlord's permission to make alterations.

Projects for the renovation and modification of facilities have been, and will continue to be, accomplished by civilian firms through contracts executed by Air Ministry.

The U.S.A.F., as a "guest" Air Force, is accorded stations and facilities on practically the same basis as the "host" nation's own Royal Air Force. As a "paying guest," its bills are reckoned on the basis of "extra cost" to the Air Ministry, with no element of profit.

The relationship may well be likened to a relative who is living in as a matter of convenience to both parties. Under such circumstances it is necessary for the "relations" to deal with some individual member of the family in determining his fair share of costs of running the household.

In the case of the United States Air Force, that member has been the Air Ministry.

The Air Ministry has been the U.S.A.F.'s agent in every phase of arrangements in the United Kingdom. Whether it be land or United Kingdom civilian employees or equipment in some instances, the Air Ministry has been the agency to handle our problems.

When the rotational training programme was being established in mid-1948, the (then) 3rd Air Division had a minimum nucleus of personnel, and a very limited supply of furnishings and equipment.

Through the Air Ministry it was possible in the initial period to obtain from the Royal Air Force several hundred officers and enlisted ranks to provide base support facilities at those stations assigned to the U.S.A.F. In addition, the R.A.F. supplied a major portion of the furnishings and equipment necessary to initiate our activities at those installations.

Today, the Air Ministry, at those stations that have been administratively transferred to the U.S.A.F., maintains a liaison office, staffed by R.A.F. personnel, the personnel strength of which depends upon the size of the installation. These liaison offices provide an immediate source for solutions of problems encountered by the U.S.A.F. base commanders and staff officers pertaining to Air Ministry policies and procedures.

In the initial stages of the programme, back in 1948 and 1949, those bases could not have been opened had it not been for the aid and assistance of the R.A.F. and Air Ministry. It was a complete support effort.

Not only did the Air Ministry give invaluable services in those initial days, but it is continuing to render valuable assistance to the U.S.A.F. in its day-to-day operations in the United Kingdom.

The Air Ministry acts as the U.S.A.F. agent in all matters pertaining to United Kingdom personnel employed by the U.S.A.F., with the exception of those employed by quasi-official military agencies, such as catering personnel for the officers' and non-commissioned officers' messes. Pay rates, policies, over-all supervision and prerogatives of hiring and administering of United Kingdom civilian employees are exercised by the Air Ministry.

This arrangement serves a dual purpose. It obtains for the U.S.A.F. skilled employees, and at the same time assures that the British economy and British labour market is not disturbed by competition from U.S.A.F. agencies.

U.S.A.F. PERSONNEL IN THE UNITED KINGDOM

There are approximately 38,000 American military personnel in the United Kingdom today, plus an additional 20,000 dependants. These figures include S.A.C. groups on training tours, the Engineer Aviation Group, the 32nd A.A.A. Brigade, the 7th Air Division and the Third Air Force personnel.

The normal tour of duty for Third Air Force and 7th Air Division personnel "permanently" assigned to the United Kingdom is three years.

Most of the married personnel reside with their families in the villages and small towns near by those stations assigned the U.S.A.F.

It has been an interesting process, this infiltration of American families into the English countryside life. The reception accorded those families has been a warm and pleasing one.

Particularly during the Coronation period was this warmness evidenced. The American Service man and his family were invited to observe not merely the local Coronation activities, but was actually encouraged to join in those activities.

Relations between the personnel stationed at the R.A.F. bases assigned the U.S.A.F. and the residents of the neighbouring villages and towns are for the most part at a high level. Much constructive aid has been contributed spontaneously by local civic and social organizations in establishing these relations.

When people really get to know each other, this familiarity results in mutual acceptance. Differences in customs and national habits are recognized and respected. It is not difficult for the individual Briton and individual American to see in one another basic mutual traits. The American way of life is founded upon an English heritage.

These mutual similarities strengthen the alliance between the two great nations, and make possible a better, closer appreciation on the part of individuals.

A farm boy from Iowa, now an airplane engine mechanic at a base in Suffolk County, read about a farm show in one of the local newspapers. The next Saturday afternoon he "ambled" over to the show.

It wasn't too different from the "County Fair" back home. As he examined some of the exhibits, he found himself in conversation with a British farmer. The two have since developed a deep friendship in a common appreciation of the art of growing maize—it's *corn* back home, but it's grown about the same over here.

This idea of mutual interests is the key to the "Hospitality-for-Americans" programme which is being spearheaded by Air Chief Marshal Sir George Pirie.

There is a Central Co-ordinating Committee in London for this group. The over-all theme of the programme is to bring American service men and citizens of local communities together through mutual interests—whether those interests be stamp-collecting, bee-keeping, horse or auto racing, or farming.

Many fine and lasting friendships have resulted from the programme, which thrives on the co-operation of social and civic groups and individual citizens. These committees usually include the Lord-Lieutenant or the Lord Mayor, officers of social and civic clubs in the area, leading citizens and trades people, and the R.A.F. liaison officer and U.S.A.F. base commander of the station in the area.

During a recent visit to Headquarters Third Air Force, a Member of Parliament's eyebrows lifted sharply when, in reply to a question, he was advised that there was no liaison between the U.S.A.F. and R.A.F. However, he settled back in his chair when it was explained that *liaison*, in the usual sense, has a connotation of communications between two agencies by means of one or more intermediaries; whereas the U.S. Air Force has a close personal relationship with the Air Ministry and the Royal Air Force at all levels. When advice or assistance is needed, our opposite numbers can be telephoned with complete assurance that all possible help will be given expeditiously.

The U.S.A.F. is in the United Kingdom today to help assure lasting peace for the free world. When peace is assured and the U.S. Air Force returns to its bases in the United States, it will be with a spirit of appreciation and affection for this period of living-in with the Air Ministry, the Royal Air Force—and the British people.

Major-General Francis H. Griswold, Commander 3rd U.S. Air Force.

The Author of this Article

Major-General Francis H. Griswold, U.S.A.F., enlisted in the Air Corps as a flying cadet in 1928 and was commissioned a second lieutenant on 1st February, 1930, in the Regular Army. Between 1930 and 1943 he served at Selfridge Field, Hickam Field, Hawaii, Langley Field, and March Field. In 1941 he was sent to Washington as a lieutenant-colonel to be Chief of the Fighter Branch of the Air Corps.

In 1943 he went to England as Chief of Staff and later Commanding General of the 8th Fighter Command, 8th Air Force. From 1946 to 1948 he was Commanding General of the Twentieth Air Force in the Marianas Islands. He then held the post of Assistant Deputy Chief of Staff for Materiel, Headquarters, United States Air Force, from 1948 to 1950. He was Military Director for Production and Requirements, Munitions Board, from 1951 until his assignment as Commanding General, Third Air Force in England. General Griswold took command of the Third Air Force on 6th May, 1952.

He is an active Command Pilot with over 7,000 flying hours to his credit. During the war he was awarded seven decorations, which included the Distinguished Service Medal, Legion of Merit with Oak Leaf Cluster and the Air Medal. He also holds the Legion of Honour and the Croix de Guerre.

ROYAL THAI AIR FORCE

BY AIR COMMODORE HARIN HONGSKULA, R.T.A.F., *p.s.a.*

THE story of a small air force of a small nation would not normally be of sufficient interest to the readers of AIR POWER, but for those who believe in one of Æsop's fables that the little mouse may sometimes help the lion, this article may help you to understand your little ally a bit better.

HISTORY

When aviation became popular in Europe, Thailand, at the far end of South-East Asia, was interested in this new achievement too. The Ministry of War, on 18th January, 1911, sent three officers of the Royal Engineers to France to study flying and mechanics. All of them graduated and received diplomas from the French Aero Club. The head of the Mission (Air Marshal Phya Chalerm Akas, the first Commander-in-Chief of the Royal Thai Air Force) who was then a Major, also received the Certificate of Military Aviator from the "Ministère de la Guerre" in 1913.

These three officers returned to Thailand in November, 1913, bringing with them four Breguets and four Nieuports (engines ranged from 28 to 120 h.p.). The Flying Corps was then formed as a part of the Royal Engineers, with the full strength of eight aircraft, three officers and a handful of airmen.

In January, 1914, eight Army officers volunteered to be trained as pilots. Five of them succeeded. An aerodrome was then constructed, mechanics trained and workshops enlarged. In May, 1915, the first aeroplane to be constructed in Thailand by the Thai people was in the air. It was the Breguet type, constructed of materials found locally, except the engine, which was imported from France. In the same year six aircraft took part successfully in the Army manœuvres.

FIRST WORLD WAR

In July, 1917, Thailand declared war against the Central Powers, and sent her Expeditionary Force to Europe. This force was comprised of the Army Transport Corps and the Flying Corps.

Forty-seven officers and fifty-nine other ranks of the Flying Corps were sent to the French Army Flying Schools at Istres and Avord. Ninety-five qualified as military pilots. At the same time ground personnel were sent to various schools and establishments in the French Army.

In the advanced stages twenty-eight fighter pilots were trained at Poix, twenty-five at the Gunnery School at Biscarosse, thirty-seven were sent to the Bomber School at Le Crotoy and five to the Recce School at Chapelle-la-Reine.

These pilots took part in the latter period of the war, and after that joined the Army of Occupation in Rhineland and Neustadt. After the Victory Parade in Paris, personnel of the Royal Thai Flying Corps were sent to various schools and aircraft factories in France for further training. Four officers and six airmen came to England for a physical training course at Aldershot. These men also took part in the Royal Tournament at Olympia.

All of them returned home in August, 1919, with five Legion d'Honneur and eighteen Croix de Guerre added to their credits as awards for bravery in war.

BETWEEN THE TWO WARS

When the Thai Expeditionary Force came home they brought with them three types of war-surplus aeroplanes, Nieuport (80-120 h.p.), Spads Mark VII

[Air Ministry Photo

Air Chief Marshal Fuen R. Riddhagni, C.-in-C. Royal Thai Air Force, shaking hands with Lord D'Lisle and Dudley, V.C., Secretary of State for Air, when the former visited this country in July, 1953.

and Mark XIII (180-220 h.p.) and Breguet Mark XIVa and XIVb (300 h.p.). The new Service was then known as the Royal Aeronautical Service, but still under the Ministry of War.

An internal air-line was also formed in 1920, flying between remote districts, using Service aircraft and Service personnel. Many good will flights were sent to neighbouring countries, including the flight to India in December, 1929, by three "Boripatra" aircraft which were designed and constructed by the Thai engineers (using Bristol Jupiter engines). Among the R.A.F. visits to Bangkok during this period, leaders of the Missions included Air Marshal Sir Geoffrey Salmond, in 1930, and Air Vice-Marshal Tedder (now Marshal of the Royal Air Force, Lord Tedder) in 1937.

In October, 1936, the Royal Aeronautical Service became a separate Service, and Army khaki uniforms were replaced by Air Force blue. In April, 1937, by Royal decree, this new Service was renamed the Royal Thai Air Force.

On the training side Thailand sent officers and students to the U.S.A., France, Italy and the United Kingdom, including two to Cranwell in 1923. These officers (among them was the present Commander-in-Chief, Air Marshal Fuen R. Riddhagni, who graduated from the Central Flying School and was attached to various R.A.F. stations from 1935 to 1937), studied the cream of modern air forces in America and Europe and transferred their knowledge to young trainees in their own country.

As for training aircraft, Thailand tried the American P.T.1 in 1929 and British Avro 504 in 1930. The latter type was very successful, so that the R.T.A.F. workshops started constructing them under licence, and the Flying Training School was still using Avro 504 until 1945.

To select the fighters, Thailand tried Boeing P.12, Heinkel and Bristol Bulldog during 1931 and 1933, but finally she decided to build under licences Curtiss Hawk Mark II and Mark III and Vough Corsair in 1934, a squadron of Curtiss Hawk 75 being bought in 1939.

Apart from the fighters, a squadron of Glenn Martin medium bombers was purchased and a considerable amount of Fairchilds were used in Communication squadrons.

SECOND WORLD WAR

At the beginning of the Japanese invasion in South-East Asia a squadron of Hawk III (maximum speed 220 miles per hour) tried to resist the invader at Watana Nakorn (near the eastern border of Thailand) and was met and outnumbered by Japanese Zeros. Only the name of that squadron was left. While in the south members of No. 5 Wing, at Prachuab Kirikhand, fought to the bitter end. Before the truce talks began this Wing lost one-third of its personnel, enemy casualties being about three to four times greater.

During the period of occupation the R.T.A.F. had to play Dr. Jekyll and Mr. Hyde. When the Resistance Force could get in touch with the Free Thai in America and in England, the R.T.A.F. helped to smuggle out Allied pilots who had been shot down in Thailand and place them in safe hands. Later on staff officers were sent to India (by British submarines and American aircraft) to work with the American "O.S.S." and British "Force 136."

Flying units were then moved from permanent bases to temporary war-time airfields as a matter of courtesy extended to the "friendly Japs." The Japs seemed pleased at first, only to find later that the bases they moved into were unbelievably accurately bombed. Workshops were rendered useless by moving machine tools to remote districts, so that the Japs could not "borrow" them, the excuse being that we had to get rid of the Allied bombing.

THE ROYAL THAI AIR FORCE

Formation flight over Bangkok Control Tower

Briefing for Fighter Pilots (*F-8-F Squadron, Bangkok*)

Two secret airstrips (apart from numerous dropping zones) were built for the Dakotas in the north-east of the country. Phukeo for the Americans and Noanhan for the British, which opened up suitable means for the reception of Allied personnel, armaments and equipment. From these two airstrips the R.T.A.F. Martins and Fairchilds transported men and materials to various resistance headquarters all over the country. Officers and airmen were sent to many dropping zones as "advisers" and as armament instructors. Pilots and radio operators were also sent to India. Thus we played our part during that grim period.

THE NEW ERA

After the war many high ranking officers were sent to the United Kingdom on good will missions. More officers attended courses with the R.A.F., the U.S.A.F. and the French Air Force. Since the end of the war the number of these graduates has reached approximately 200. The Royal Thai Air Force is now reorganized and re-equipped to meet the present-day situation.

In 1950 Thailand decided to send her troops to Korea. It was the first small nation to act promptly as a good member of the United Nations. The Army sent one combat team, the Navy three frigates and the R.T.A.F. one transport squadron (Dakotas), with the evacuation team (medical officers and nurses). This squadron is still now on active service in Korea.

The United States Government sent the M.A.A.G. (Military Assistance Advisory Group) to Thailand in 1950. The air section of this group (now numbered seventeen officers and twenty-three N.C.Os.) is assisting the R.T.A.F. in equipping and training fighter-bomber squadrons and supporting the transport Wing. They select officers and N.C.Os. for further training (free of charge) in the U.S.A.F., and assist operating schools in Thailand. Quite a number of T-6 (Harvard) and F-8-F (Bear Cat) have been given under the M.D.A.P. scheme. In 1954 it is hoped that jet fighters will be available for the R.T.A.F.

THE ROYAL THAI AIR FORCE TODAY

The present organization is based on the combined R.A.F./U.S.A.F. system. The Air Council, the Department of the Chief of the Air Staff, Technical Staffs and R.T.A.F. Regiment are nearly the same as the R.A.F.'s. The "Three Prong Organization" is applied as far as possible. Only on the training side, all schools and training establishments are under one Directorate, more or less like the U.S. Air University. The yearly intake of trainees averages about 100 officers (G.D. Branch from Military and Naval Colleges, Technical, Medical and other Branches from Universities) and 500 apprentices (from High School graduates). Courses vary from one to three years.

As mentioned before, we are anxious to send more officers and students (today there are thirty-four) to the United Kingdom, not only because the Commander-in-Chief himself was trained there, but, as a matter of fact, we appreciate the training system, we like the people (especially in the R.A.F. Mess —at the bar of course!), we know that to preserve peace in the Far East we must understand each other and "speak" the same language; but the burden is the high cost of flying training, and we have not enough sterling to meet all that we wish to do. The flying strength of the R.T.A.F. consists of a Tactical Air Command (six operational wings and one transport wing), a Flying Training School and a Flying Club. Aircraft used are:

Training: Tiger Moth, Miles Magister, Chipmunk and Harvard.

Communication: Piper L-4, Stinson L-5, Bonanza.

Air/Sea Rescue Helicopters: Hiller, Sikorsky S.51.

Transport: Beechcraft C-45, Douglas C-47.

Fighter: Spitfire, Bear Cat (F-8-F), Helldiver (SB-2-C).

EPILOGUE

There is no need to emphasize the importance of Singapore to the British Commonwealth. Those who are interested in geo-politics may look at Singapore as a pivot of a war-waging phase, both in South-East Asia and in the South-West Pacific. The fall of Thailand may more or less mean the fall of Singapore and after, all areas beyond it.

Will the Reds move south? This is not very difficult to predict. Should history repeat itself again, it would be more serious this time, because tens of millions of Chinese with Soviet arms could move on land more easily than the Japs did in 1941, because Viet Minh would support them in Indo-China, because a certain number of terrorists in Malaya would help them, and a few more "becauses."

Close co-operation and a well-planned mutual defence scheme are essential. Sympathy only would not be enough to save the country which is the gateway to these vast important areas. Thai policemen are trained (free?) by their British opposite numbers to help kill terrorists in Malaya, and this has proved so successful. Why, for the much bigger task, not the two Air Forces?

"THE AIR TRAINING CORPS"—FEEDER LINE TO THE ROYAL AIR FORCE

BY WING COMMANDER G. J. RAYNER, O.B.E.

HISTORY

THE Air Training Corps this year celebrates its twelfth anniversary. On 1st February, 1941, a Royal Warrant was issued establishing the Corps which had previously been known as the Air Defence Cadet Corps. His Majesty King George VI became the first Air Commodore-in-Chief.

On 15th January, 1953, His Royal Highness The Duke of Edinburgh was appointed the second Air Commodore-in-Chief. The original Air Defence Cadet Corps was brought into being by the Air League of the British Empire during the year 1938 and the first squadron to be formed in the United Kingdom was No. 1 Squadron of the City of Leicester. During the Second World War nearly half a million cadets passed into the Air Training Corps, and up to VJ Day, 1945, some 170,000 had completed their training and passed into the Services. More than 10,000 cadets actually entered the Royal Air Force and roughly half of this number were graded as members of aircrews. It is pleasing to record that more than five hundred cadets were decorated for bravery and they included a V.C., D.S.Os., D.F.Cs., A.F.Cs. and many other decorations, a truly wonderful record of youth who undoubtedly can be said to have produced the cream of the entry to the flying Services during these important years.

ORGANIZATION OF THE AIR TRAINING CORPS

The Air Training Corps today consists of approximately 42,000 cadets, 3,000 officers, 800 warrant officers and 2,000 civilian instructors. The direction and policy of the Corps is the responsibility of the Air Ministry; the command, training and administration is the responsibility of the Air Officer Commanding-in-Chief, Home Command, Royal Air Force.

The Command controls the detailed work through the Cadet Branch and under the direct responsibility of the Senior Air Staff Officer. The chain of Command is, Cadet Branch to Groups, Groups to Wings, Wings to Squadrons—with the Squadrons are linked the local civilian committees. Each group has its complement of wings and squadrons organized on a numerical basis for command purposes and controlled by the Air Officer Commanding the respective group.

At the Air Ministry level, the Air Training Corps has its own Council—known as the "Air Cadet Council." This is presided over by the Under-Secretary of State for Air, Air Member for Personnel as the Royal Air Force member, Director of Air Reserves and Cadets as the Cadet Services representative, the Air Officer Commanding-in-Chief, Home Command, and the duly elected representative members of the Services and the civilian committees. The Council is responsible for decisions on all aspects of policy and relationship with the Ministry of Education and other pre-entry Services.

A cadet Central Council of Welfare is supplementary to the Corps and is responsible for the allocation of non-public welfare funds in relation to the Corps.

In Scotland a separate Air Cadet Council functions in a similar manner to the London Council. Its policies, however, apply only to Scotland, although major problems remain the responsibility of the Air Ministry and the Air Officer Commanding-in-Chief, Home Command.

FORMATION OF SQUADRONS

Squadrons are formed locally, usually through the energy and interest of business men and important local personalities, who agree to sponsor a squadron. A chairman is elected and four other members of the committee are co-opted. The request to form a local squadron is forwarded to the Air Ministry, with the name of a prospective officer recommended to command the squadron. The nomination may be in respect of a retired R.A.F. officer or a civilian with no previous Service knowledge. If the civilian is acceptable, he is given suitable training.

Following approval in principle for the formation of a squadron, Group is responsible, in conjunction with the local Territorial and Air Forces' Association, for finding suitable accommodation. When satisfactory accommodation is found, application is then made to the Command headquarters for the recognition of the unit as an official squadron of the Air Training Corps. Recruiting commences and the number of boys joining the squadron decides the officer and N.C.O. status. It is desirable that the squadron should have about 120 cadet members for the commanding officer to hold the rank of Squadron Leader, but the question of rank is also related to the degree of proficiency of the particular squadron. There are two distinct types of squadron in the Corps—the school squadron and the open or town squadron. The school squadron is not connected in any way with the R.A.F. sections of the Combined Cadet Force.

OFFICERS

Officers are usually retired officers or civilians who undertake to become Volunteer Reserve officers in the Training Branch. They receive a uniform allowance but no standard rate of Service pay. Officers, however, attend cadet camps annually, and specially organized courses; for the period of these public duties they receive the same rates of pay and marriage allowances as Regular officers of similar rank. They are also paid mileage allowance when they use private cars for Service purposes. All ranks are acting apart from the initial substantive rank of Pilot Officer for the non-Service officer, and Flying Officer for those who have held a commission in one of the Services.

WARRANT OFFICERS

Warrant officers are usually obtained from among retired warrant officers of the R.A.F., or civilians who are appointed through their keenness and allegiance to the Corps and who do not wish to be officers. Senior cadets who are awaiting National Service or who have returned to the squadron after a period in Regular Service are also eligible. As in the Regular Service, the warrant officer is a key man in his squadron.

CIVILIAN INSTRUCTORS

Each squadron has its complement of civilian instructors who are experts in technical subjects and, in consequence, of considerable value to the Corps. The civilian instructor does not wear uniform and, therefore, is not subject to the regulations that apply to an officer holding the Queen's Commission.

CADETS

Cadets are accepted into the Air Training Corps from the age of fourteen years to eighteen, and are provided with a complete R.A.F. pattern uniform to wear throughout their cadet service. They do not pay for any part of their uniform.

During the first year of service, it is usual to separate the cadets in the lower age groups and bring them along in easy stages, impressing on their minds the fundamental principles of discipline and good citizenship. They pass at fifteen and a half years of age into the normal training of the squadron. Cadets of the Air Training Corps are drawn from all classes of the community and may leave the squadron at any time. They are not prevented from joining any other youth movement while they are members of the Corps. Each cadet is given a Record of Service book in which all his accomplishments, character and references are recorded. When he is due to enter the Royal Air Force for his period of National Service, or should he elect to enlist or obtain a cadetship, his record of service is most valuable to the selection boards.

CADET TRAINING

Cadet training is divided into three parts—Basic, Proficiency and Advanced training—as follows:

(*a*) *Basic Training.*—This provides the cadet with a broad general Service background on which subsequent training is founded. This training is compulsory and leads to the qualification of "First Class" cadet.

(*b*) *Proficiency Training.*—Those who have qualified as "First Class" cadets proceed with the proficiency training. This provides them with an opportunity to specialize in aircrew training, signals, electricity and aircraft engineering.

(*c*) *Advanced Training.*—This is a continuation of the proficiency training and is undertaken by cadets after the award of the proficiency badge. On the completion of the advanced training examination, the cadets can be, and usually are, employed as instructors to the younger cadets.

(*d*) *Technical Schools, Colleges and Institutes.*—Cadets who have passed Part "A" of the proficiency examination are granted exemptions from the "B" and "C" technical parts of the syllabus by successfully completing courses at technical schools, colleges or institutes. Exemption from the specialized part of the syllabus may also be granted to cadets who obtain the full certificate in engineering in the case of the proficiency stage and the higher National Certificate of Engineering for the advanced stage.

CAMPS AND VISITS TO R.A.F. STATIONS

To enable cadets to follow up early training in squadrons, which usually takes place on two or three evenings a week. Easter and summer camps are organized on large R.A.F. stations. These camps are staffed by Regular and R.A.F.V.R.(T.) officers. Each camp is of one week's duration. The syllabus of training for camps is designed to amplify the specific work of the squadron. Lectures, flights in R.A.F. aircraft, sports and exercises are organized to fit into the week's training. Location of camps varies a great deal, although every effort is made to keep cadets as near the sea as possible, and so make the training period a part-holiday.

Tented camps or hutted quarters are kept quite separate from the Regular forces, plenty of organized games and good food ensure that the cadets receive the maximum value as a result of their training. Liaison visits to Regular R.A.F. stations are organized by the squadrons through the Group Training Liaison Officers and the R.A.F. Station Pre-entry training liaison officer, known as the Station P.E.T.L.O. A great deal of help is usually given by all ranks, and it is true to say that the A.T.C. cadet can be rightly termed the "younger brother of the Royal Air Force."

FLYING AND GLIDING

Provision is made for cadets to fly at week-ends at the annual camps and whenever it is possible for them to obtain air experience with the Royal Air

[Photo: Richard Arless Associates, Montreal

A.T.C. cadets being greeted on arrival at the Montreal Airport, Canada, during the 1952 reciprocal visits.

Force. Cadets are given air experience following their classification as first-class cadets. Home Command communication flights, for example, provided for more than 32,000 cadets flying annually, and during 1952 more than 10,000 hours' flying for cadets was provided by affiliated stations.

Gliding is a part of the cadet training, and gliding schools are established throughout the country. The majority of gliding instructors are R.A.F.V.R.(T.) officers who undergo extensive training at the Gliding Instructors' School. A great deal of attention is paid to gliding and it is extremely popular with the cadets. As a proof of the value of gliding, during 1952 some 1,200 cadets qualified for the Royal Aero Club "A" and "B" Certificates, a standard roughly equivalent to that reached by a pupil pilot practising his first solo circuits.

Some fifty cadets reached the National "C" Certificate standard, which indicates they had successfully soared a sailplane for a period of not less than five minutes. It is estimated that cadets and instructors completed more than 5,000 hours in 300 gliders at forty-five week-end gliding schools and at Home Command Gliding Instructors' School, which is established at Detling.

The object of glider training is not necessarily to teach the cadet to fly, which of course is undertaken by the Royal Air Force after enlistment. It encourages as many cadets as possible to take a practical interest in flying; it provides a practical training in aero-dynamics, meteorology, instrument flying and navigation; and lastly, it develops amongst cadets such personal qualities as initiative, self-confidence and a sense of responsibility and adventure.

METHODS OF GLIDER TRAINING

All training in the Corps to the solo-circuit stage is now given in two-seater "Sedburgh" and Cadet Mk. 3 gliders, by what is known as the two-seater method of training.

ADVANTAGES GRANTED TO THE PROFICIENT CADET

On passing his proficiency examination, the cadet is awarded a special badge to wear on his uniform and he becomes eligible for a number of rewards for his achievement. His Squadron Commander can recommend him for the following:

(*a*) *A Flying Scholarship.*—This, perhaps, is the biggest "plum" a cadet can get. In 1950 a scheme was introduced whereby selected cadets of the A.T.C. and R.A.F. Sections of the C.C.F. (Combined Cadet Force) may be awarded flying scholarships which provide for approved Ministry of Civil Aviation flying courses on light-type aircraft to the standard required for a private pilot's licence. The course, which consists of fifteen hours' dual instruction, fifteen hours' solo flying and lectures on allied subjects, is taken at one of the thirty-eight civilian flying clubs approved by the Ministry of Civil Aviation contracted by Air Ministry, and whose flying instructors have been tested and approved by Home Command. From the inception of the "A.T.C./C.C.F./R.A.F. Flying Scholarship Scheme," 1,081 cadets have received the award, and of these, at the time of writing, 732 have qualified for the private pilot's licence, and 198 are still under training. A further 500 scholarships are available for award during the 1953-54 financial year. The award of a flying scholarship is open to all proficient cadets in the Corps.

(*b*) *Overseas tours* to Canada and the U.S.A., India and Pakistan, on a reciprocal basis.

(*c*) *Leadership courses* at the Outward Bound Mountain School at Eskdale, Cumberland.

(*d*) *Flights to all parts of the world* accompanying senior R.A.F. officers.

(*e*) *Participation on regular air routes throughout the world;* for example, during 1952, 100 cadets were flown by Transport Command on scheduled services to Berlin, Fayid, Habbanya and Singapore. Coastal Command carried many more to Gibraltar.

Careful consideration is given by the R.A.F. recruiting authorities to all cadets who have trained with the A.T.C., and whose records of service book proves their qualifications.

COURSES OF INSTRUCTION

Special courses are organized for the young cadet who is pre-selected for promotion. He can attend weekly courses during his school or works holidays and specialize in any subject he elects to study. He is given opportunities for rifle-range practice, to swim and qualify for Service Swimming Certificates, he can be taught the duties and functions expected of a cadet N.C.O., and during his course he is given the opportunity of seeing the workings of the Regular apprentices' technical schools and allowed to mix with the boys who have already passed into the Service.

Courses are organized for the R.A.F.V.R.(T.) officers and warrant officers, where they are kept up to date with the progress of the Royal Air Force. Officers of the R.A.F.V.R.(T.) are not promoted until they have successfully completed a standard refresher course.

SPORT

Sport plays a great part in the training of cadets. Command, Group, wing and squadron trophies are competed for regularly in all phases of sport. Boxing,

AIR CADETS BEING GREETED ON ARRIVAL IN WASHINGTON, D.C.

swimming, football and cricket are keenly contested on a national basis and with boys' clubs and other pre-entry Services.

BANDS

All A.T.C. bands are self-supporting, and no funds are available for the purchase of instruments. Most squadrons do have a band and the instruction in band playing does not excuse a cadet from any part of his proficiency examinations.

THE COMBINED CADET FORCE—ROYAL AIR FORCE SECTIONS

The Combined Cadet Force functions in schools where the school-leaving age is seventeen or over. Headmasters may elect to have one or more Service sections within the framework of their contingent.

At present there are some 190 schools with R.A.F. Sections of the Combined Cadet Force, making a total number of nearly 7,000 cadets. The syllabus of training is necessarily shorter and to an extent simpler than that given to A.T.C. cadets since much of the C.C.F. cadet's time is taken up with academic and sporting activities of the school and a correspondingly shorter time is available for pre-entry training.

All the specially organized R.A.F. training for the A.T.C. is available on an "equal share" basis to the R.A.F. Sections of the Combined Cadet Force although the vast majority of flying scholarships, gliding, overseas flights and other activities must perforce be accepted by C.C.F./R.A.F. cadets during the school holidays.

In addition, any special benefits such as those available to proficient cadets of the A.T.C. for entry into the R.A.F. College, Cranwell, and those governing National Service entrants apply equally to proficient cadets of the C.C.F./R.A.F. Sections.

Officers of the C.C.F. are recruited from the school staff and, since this is essentially a Combined Force, the contingent commander may wear the uniform of any one of the Armed Services.

SUMMARY

It is not possible to put forward the full case for the Air Training Corps or the C.C.F./R.A.F. Section in one small article. There is no doubt that the Corps itself is an alive and alert body of young men, capable of giving of their best not only to the Service but in all walks of life. Their training in self-discipline with a sound moral background at an impressionable age ensures a high percentage of first-class citizens ready to face whatever imposing tasks the future may bring. The introduction of the reciprocal visits scheme between both Canada and the United States of America which started in 1948 has done a great deal to enlighten the youth of these countries and assists greatly in achieving the objects of the Corps. These objects are to promote and encourage young men to take a practical interest in aviation and to fit them to serve their country in the Royal Air Force, its Reserves and Auxiliaries as also in the air branches of the Royal Navy, now known as the Fleet Air Arm, and in the Army. Further, the Air Training Corps provides training which will be useful both in the Air Services and in civilian life, fosters the spirit of adventure, promoting sports and pastimes in healthy rivalry and developing the qualities of mind and body which go to the making of a leader and a good citizen.

Photo: Gale & Polden Ltd.

Air Chief Marshal Sir John Whitworth Jones, K.C.B., C.B.E., presenting the Norton Sword to the University cadet (Technical Cadet D. J. Pugh) who achieved the highest all-round standard.

GRADUATION PARADE OF TECHNICAL CADETS (UNIVERSITY) AT THE ROYAL AIR FORCE TECHNICAL COLLEGE—HENLOW

By Wing Commander H. R. P. Patterson, O.B.E., M.A.

THE Passing-out Parade of the first entry of Technical Cadets (University) was reviewed by Air Chief Marshal Sir John Whitworth Jones, K.C.B., C.B.E., Air Member for Supply and Organization, at Henlow, on 25th September, 1953.

The parade consisted of thirty-one cadets who were under the orders of the Cadet Parade Commander, Technical Cadet C. A. Cooper. Forming a background on the parade ground there were student officers of the R.A.F. Technical College, including a representative section from the Debden Division. The drill and various movements were carried out with great smartness and precision and there is little doubt that this first entry has set a high standard for those which follow.

Following the advance in review order the Air Marshal presented the Norton Sword, which is a challenge trophy awarded to the University cadet who has achieved the highest all-round standard, to Technical Cadet D. J. Pugh.

At the graduation ceremony which followed, the Commandant of the College, Air Commodore H. D. Spreckley, C.B., C.B.E., welcomed Air Chief Marshal Sir John Whitworth Jones as reviewing officer. Sir John had been A.O.C.-in-C. of Technical Training Command when the College and the Cadet Scheme were planned and now as A.M.S.O. was vitally concerned with the efficiency of the Technical Branch. The Commandant spoke of the first task of the College—to instruct the cadets in the duties, behaviour and responsibilities of an officer of the Royal Air Force—and of the second special aim which was to prepare the University cadets for the qualifying examination for the Mechanical Science Tripos of Cambridge University. In spite of relatively small numbers the cadets had given a very good account of themselves in a wide range of sports, including rugby, hockey, cross-country running, boxing, fencing and rowing. Their academic attainment had been praiseworthy; seventeen passed with high marks and fifteen were going to Cambridge.

The Air Marshal then addressed the cadets in the presence of their parents and guests. He drew attention to the particular significance of the occasion. It marked the first stage of the training of technical cadets for the Royal Air Force which was introduced in October, 1952. Although the cadets had completed their basic year of training they were still far from qualifying for permanent commissions. They had, as it were, changed from short pants to long trousers, but they had not yet got to the status of "have the key of the door." They had to acquire not only further technical knowledge but qualities of fine character and true leadership.

At the present stage there was a bifurcation of training: one stream of cadets remained at Henlow whilst the others departed to the universities. The reason for this lay in the demand in a mechanized world for very high-grade technicians —"know-how" men—to turn engineering research to practical advantage. The universities could not carry the whole load of this particular form of training. It was urgently necessary to train professional technicians having equal status with university graduates. The Royal Air Force required officers of this description

[Photo: Gale & Polden Ltd.

Air Chief Marshal Sir John Whitworth Jones, K.C.B., C.B.E., presenting the Franks Trophy to the University cadet (Technical Cadet C. A. Cooper) who achieved the highest standard of General Service training.

Photo: Gale & Polden Ltd.

HENLOW, 25*th SEPTEMBER*, 1953

The Passing-out Parade of the first entry of Technical Cadets (University) being reviewed by Air Chief Marshal Sir John Whitworth Jones, K.C.B., C.B.E., Air Member for Supply and Organization.

and training at the R.A.F. Technical College was designed to produce them. We must also have our proper quota of university-trained engineers and so a proportion of young men of appropriate bent are sent to universities. Both types of men are essential to the Service and they have equal status and importance.

The Air Chief Marshal reminded the Henlow cadets of their great responsibilities. It was up to them to set the highest standards of character and competence and thus create the basis of a tradition that would make the R.A.F. Technical College one of the most outstanding academies of the new type in the United Kingdom. The University cadets were going to institutions where the development of character had been a primary function for generations and he charged them with providing examples of conduct which would command respect for the R.A.F.

Finally the Air Marshal produced the commission actually awarded by Queen Victoria to an officer of the 60th Foot and quoted from the text of it. He pointed out the high standard required by the simple words in which the commission was phrased. Only by achieving that high standard of moral courage, good conduct and trustworthiness could one be dedicated to the Queen's service and the service of the country.

The Air Marshal presented the Franks Trophy to Technical Cadet C. A. Cooper. This award is made to the University cadet who has achieved the highest standard of general service training.

The Mathematics Prize was awarded to Technical Cadet D. K. Pettifer

The Science Prize was awarded to Technical Cadet D. J. Pugh.

Supporting the reviewing officer were the A.O.C.-in-C. Technical Training Command, Air Marshal Sir Victor Groom, K.C.V.O., K.B.E., C.B., D.F.C., and Air Commodore H. D. Spreckley, C.B., C.B.E., Commandant of the College. Amongst other guests were Air Marshal L. G. Harvey, C.B., A.O.C.-in-C. Maintenance Command, Air Vice-Marshal C. E. H. Allen, C.B., D.F.C., B.A., M.I.Mech.E., Director General of Technical Services, and Air Vice-Marshal J. G. Franks, C.B.E. (late Commandant of the College), A.O.C. No. 24 Group.

The University cadets who passed out on this occasion will proceed to the following universities: Technical Cadets D. M. F. Bright, Peterhouse, Cambridge; C. A. Cooper, Clare, Cambridge; R. L. Doorne, Emmanuel, Cambridge; A. J. Elburn, Fitzwilliam House, Cambridge; W. R. J. Fewing, St. John's, Cambridge; M. W. S. Grigson, Queens', Cambridge; M. J. Guest, Lincoln, Oxford; B. A. T. Jennings, Fitzwilliam House, Cambridge; E. A. Mansfield, St. John's, Cambridge; P. L. T. Owen, Trinity Hall, Cambridge; M. J. Pettet, Bristol University; J. K. Pettifer, Trinity Hall, Cambridge; J. A. Porter, Bristol University; D. J. Pugh, Pembroke, Cambridge; D. M. Reader, Trinity, Cambridge; P. Robarts-Arnold, Sidney Sussex, Cambridge; C. J. Shaw, Southampton University; J. Wardle, Imperial College, London; D. Williams, Christ's, Cambridge; J. B. Windsor, St. Catharine's, Cambridge.

When these cadets have taken their degrees they will return to the Technical College at Henlow for a six months' course to familiarize themselves with current equipments and organization.

The Henlow cadets now in their second year at Henlow spend, in all, three years at the College. At approximately the half-way stage in their training an entry is switched either to an electrical or mechanical syllabus according to the requirements of the Branch. Whichever syllabus he reads, however, the student will emerge from the college at the completion of his training with a very comprehensive knowledge of aeronautical subjects.

ROYAL AIR FORCE XV IN SPAIN

Flight Lieutenant P. G. Yarranton, the R.A.F. captain, exchanges commemorative flags with the Spanish captain before the start of the R.A.F. v. Spain match in Madrid

RUGBY FOOTBALL IN THE ROYAL AIR FORCE

BY WING COMMANDER N. CAMERON, D.S.O., D.F.C.

(Honorary Secretary of the R.A.F. Rugby Union)

THE Charter of the Royal Air Force Rugby Union lays down that the Committee is responsible for the encouragement, organization and control of rugby football in the Royal Air Force at home and overseas. It was in 1920 that a band of Service rugby enthusiasts gathered in the Air Ministry under the chairmanship of Air Commodore C. L. Lambe (later Air Vice-Marshal Sir Charles L. Lambe, K.C.B., C.M.G., D.S.O.), and formed the Royal Air Force Rugby Union as we know it. It is interesting to note that one of those early pioneers was Air Commodore A. D. Warrington Morris, C.B., C.M.G., O.B.E. (then a wing commander), who is at present our Honorary Treasurer and Fixture Secretary, and who, apart from overseas appointments, has served the Rugby Union continuously throughout its history in several capacities, including that of Chairman; now a retired officer, his wealth of Service rugby experience has been of great value to executive committees down the years. Another long-serving member of the Union is Wing Commander James Lawson, O.B.E., who was Honorary Secretary from 1926 until the outbreak of the Second World War. Now Director of Sport and Inspector of Recreational Grounds, he serves on our executive committee and, with the present Chairman, represents R.A.F. interests on the English Rugby Union.

The most encouraging feature of R.A.F. rugby at present is the general health of inter-unit football. Here lies the basis of R.A.F. rugby as a whole, and regardless of the good or bad results of our representative side this development gives great satisfaction to all who have had a hand in the organization of rugby in the Service since the war. At present there are 168 unit clubs affiliated to the R.A.F. Rugby Union and they are all carrying out extensive fixture lists.

Broadly speaking, rugby in the Service is active at three levels: unit, command and R.A.F. representative level. The competitive season starts in October with the Inter-Command Championship, carried out on a knock-out basis. Also commencing in October is the Inter-Unit Shield competition for units of an establishment of 900 and below, and the Inter-Unit Cup competition for the larger units of 901 and above, and including all flying training schools, regardless of establishment. Again these inter-unit competitions are carried out on a knock-out basis and the various rounds evoke the greatest enthusiasm among all ranks. The larger stations like St. Athan have been known to transport their following to away games by special train, carrying up to 1,000 supporters.

By the time the R.A.F. representative XV start the fixture list in January, the Selection Committee have a good idea (from watching unit and command games) what talent is available in the Service. Prior to the start of the representative fixture list there is an annual game between an R.A.F. Officers XV and the R.A.F. College, Cranwell. This match serves as a useful "pipe opener" and gives the cadets a severe test before their annual match against Sandhurst. This season, instead of a final trial, two trial fifteens, selected on a North and South basis, played Moseley and Bath respectively in December. The first fully representative R.A.F. XV as such takes the field against Swansea annually on the first Saturday in January. This is always a severe test as the Welsh club is normally right at the peak of fitness and form whilst the R.A.F. side have as yet to be blended together and to get to know each other's play. From then on the fixture list is one of the strongest and most testing among first-class clubs in England. Games are played annually against the British Police, Oxford and Cambridge Universities, the Civil Service, Bedford, Coventry, Gloucester and Leicester and on alternative years with Harlequins, Wasps, London Irish, Waterloo and Birkenhead Park, culminating in the inter-Service games against the Royal Navy at Twickenham in late February and the Army at Twickenham in late March. In April there is usually a Continental tour, and last season we broke new ground by playing a Spanish representative XV in Madrid. This match had a real international flavour and much good feeling was engendered; it is hoped to repeat this fixture during season 1954-55. This year the representative fifteen go to France during the first week in April to play Lyons University, and then to the Basque Country to play Biarritz Olymique.

A great deal of friendly rivalry springs up among the three Services with the approach of the inter-Service matches. To date we have won six matches and lost seventeen against the Royal Navy, with four drawn. Against the Army we have won seven matches, lost eighteen and drawn two. The R.A.F. last won the Inter-Service Championship in 1947, though we shared it with the Army in 1949. It is hoped that we shall add to our tally of wins against both Services this season.

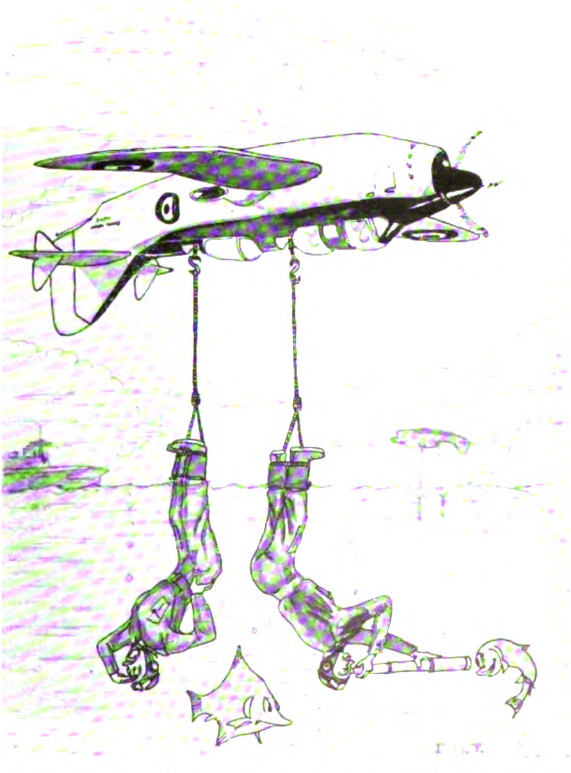
In order that no talent should go unobserved and to ensure that all likely players are given a chance to develop their rugby during their stay in the R.A.F. for National Service, a circular letter goes out at the beginning of each season to all rugby schools and first-class clubs asking for the names of promising players who have entered or are about to enter the R.A.F. This is particularly important in the case of ex-schoolboys as it is essential that during their stay in the R.A.F. they get ample opportunity to develop their games in what are the most formative years of a player's active career.

Season 1953-54 got under way in great style with the news that Her Majesty The Queen had graciously consented to be patron of our Union; Her Majesty has already graced an inter-Service match with her presence since her Accession.

We are fortunate to have as our new President Air Vice-Marshal George Beamish, C.B., C.B.E., captain of the R.A.F. XV for several seasons and holder of twenty-five caps for his native Ireland. His advice on policy and tactics and his judgment of a player's ability are invaluable. Our Chairman is Group Captain G. A. Walker, C.B.E., D.S.O., D.F.C., A.D.C., who captained the R.A.F. XV for four seasons and was playing for England in the last season before the war.

Royal Air Force rugby football benefited greatly by having Squadron Leader R. H. G. Weighill, D.F.C., as captain of the representative XV between the years 1946 and 1952. A fine forward and one well equipped with the undoubted qualities of leadership, Weighill was capped for England four times and, indeed, he captained his country on one occasion. He also captained the Combined Services. Later a committee member, his experience will be missed this season; he has been appointed to command No. 2 Squadron, in 2nd Tactical Air Force, in Europe. Another notable post-war player is Flight Lieutenant Bob Stirling, who has been capped for England thirteen times with possible additions to his total this season; he is now a member of our Selection Committee. With several experienced forwards available, including Flight Lieutenant P. G. Yarranton, who captained the R.A.F. XV last season, it is hoped to build a pack who will do credit to the Service in the tradition of W. W. Wakefield and the Beamish brothers. Best known of our available backs is Flight Lieutenant V. R. Tindall, capped for England on four occasions; but there are also several young players coming along who have matured in unit and command football and who may well get their chance to show their worth.

In conclusion, it is the aim of the R.A.F. Rugby Union Committee, and in fulfilment of our charter, that all young enthusiasts shall be given every opportunity to develop their game and be given their chance in representative football should they so merit it. Because of National Service a number of ready-made first-class players come into the R.A.F. for a short period; but it is encouraging to observe that many of our Regular elements are shaping in a most promising fashion. Last season, for example, there were two ex-Cranwell College cadets in the representative XV, and it is hoped that in the next few years there will be many more players coming along from this invaluable training ground. An increasing number of old players are coming forward to coach, organize and referee, and generally put back into the game some return for the great enjoyment they themselves experienced during their playing days. Rugby football is essentially a character-building sport in which the team spirit is of cardinal importance, and as such it is undoubtedly playing a most important part in the training of the Royal Air Force as a Fighting Service.



Anti-submarine Reconnaissance, an essential part of the Naval aviator's training.

ROYAL AIR FORCE SAILING

LONDON'S NEWEST YACHTING CLUB-HOUSE OPENED

BY A. F. TINSLEY

SLIM dinghy spars reaching skywards, silhouetted against an almost full yellow moon climbing up from behind the hills over Hendon way, while a thin white mist rose from the water beneath it. Across the water, twinkling lights of London traffic, dodging in and out of barely discernible trees.

Such was the setting in which, on a recent autumn evening, members of the Royal Air Force Sailing Association celebrated the opening of their new club-house beside Brent Reservoir, North London, after a keen day's sailing of elimination heats in the 1953 R.A.F. Dinghy Racing Championships.

Standing outside London's newest yachting club-house in the peaceful, moonlit scene, one could not help imagining he was somewhere far from the great metropolis, perhaps beside a Kentish river, perhaps on the shore of a Sussex lake. Near by glistened the brown varnished hulls of sailing craft, finished with racing for the day, resting quietly on their hard-standings. But for all the nautical atmosphere, and the rural peacefulness of the scene, it was still London—London living up to her reputation for producing big-city beauty spots where they are least expected.

The Brent Reservoir, where week-end R.A.F. yachtsmen sail their stable little 12-foot Fairey Firefly dinghies, is pleasant enough for sailing by day, surrounded by trees and green fields which rise from its edge. But it is in the cool of a fine evening, after the dinghies have been hauled up on dry land and their sails put away, that the vista from the Association's club-house is at its best. Then, from the ease of a deck-chair on the club-house porch, it is pleasant to sit and look down upon the placid reservoir, sip drinks and talk sailing. On moonlit nights, too, he who pleases may enjoy a moonlight sail over the inviting waters.

The new club-house serves as a gathering place for Air Force officers, airmen and airwomen from London and its environs, whose principal joy in life is week-end, and in summer, evening sailing, and as headquarters for the Association, under whose auspices today some sixty R.A.F. sailing clubs operate throughout the British Isles. In addition to these which, with a membership of approximately 700, are members of the Association, many R.A.F. sailing clubs in Germany, the Middle East and the Far East are affiliated to the Association.

Overseas, sailing is a highly popular pastime among Service men and women, and in the Canal Zone of Egypt alone, on big regatta days, one may see the magnificent sight of some 150 craft of varying designs and dimensions under canvas at the same time on Lake Timsah or the Great Bitter Lake, against a background of undulating sand-dunes and wavy palms.

Sailing is attracting increasing followers among the R.A.F. in Great Britain, thanks to a great extent to the enthusiasm for it brought back to this country by airmen and airwomen who have taken up sailing abroad. Many men and women sent overseas for tours of duty in Germany, Egypt, Malta, Cyprus, North Africa, Aden, the Sudan, East Africa and the Far East find themselves brought into contact with sailing, of which they perhaps knew little or nothing back home, or regarded as a pastime far too expensive to take up. Abroad they find sailing comparatively cheap, and a healthy and pleasurable occupation, and many become adept helmsmen. Returning to Britain they seek to keep up their sailing and join R.A.F. unit sailing clubs already functioning, or form the nuclei of new clubs.

Overseas R.A.F. sailors yacht against colourful and historical backgrounds. Singapore's R.A.F. Changi Yacht Club, for instance, competes annually in regattas held by the Royal Singapore Y.C., the R.A.F. Seletar Y.C., the Johore Y.C. and the Naval Base Y.C.

The R.A.F. Sailing Club at Bulawayo, Southern Rhodesia, does its sailing at Katopos Dam, eighteen miles from the town; at Khartoum, capital of the Sudan, R.A.F. yachtsmen are members of the Combined Services Sailing Club, and sail on the Blue Nile, their club-house an ancient gunboat, the *Malik*, said to have been used by Kitchener as he advanced upon Omdurman to decimate the Dervishes after their murder of General Gordon; in Cyprus, the R.A.F. sailing organization operates off lovely, ancient Kyrenia, in the shadow of towering St. Hilarion Castle, age-old mountain-top edifice which Walt Disney chose as model for the fairy castle in his *Snow White and the Seven Dwarfs*.

As testimony to the fact that overseas R.A.F. yachtsmen come home to carry on their favourite sport, one may find, almost any evening at Brent Reservoir, quite a number of men who took up sailing abroad, and in several cases became adept helmsmen. Many of them are ex-members of No. 107 Maintenance Unit in the Canal Zone, which boasts a thriving sailing club, and only recently these former Canal Zone sailors issued a challenge for a dinghy contest against "the rest" of the R.A.F.S.A.

Much is being done by the Association to encourage and increase sailing competition between its members, individually and as units, and outside civilian clubs, and in the past year R.A.F.S.A. entries have sailed against the Ranelagh S.C., 2nd T.A.F. (R.A.F.), in Germany, the London Corinthian S.C., Seaview Y.C., of the Isle of Wight, London University S.C., and in the Ralph Gore Cup Competition. At Brent Reservoir, the Welsh Hart Sailing Association holds a meeting every week-end in which its members compete for the "Implacable Sheave," a trophy made from part of the topmast of the old French warship *Implacable*, of Trafalgar fame. The Sheave is awarded every six months to the yachtsman sailing the eight best races out of twenty, and is at present held by a young National Service man, Leading Aircraftman Letton, of the R.A.F., the first Air Force yachtsman ever to win it.

FORMED IN 1948

The R.A.F. Sailing Association was formed in 1948. It instituted the annual R.A.F. Individual and Inter-Command Dinghy Racing Championships, which were held in 1949 and 1950 at Thorney Island, Hants. In 1951 the Association formed its headquarters at Brent Reservoir, where R.A.F. Station, Hendon, had its sailing club, and since then the championships have been held on the reservoir.

For its club-house in those days the R.A.F. Hendon S.C. boasted only a humble wooden hut, good for little more than storing sails and gear. Near it stood several more elaborate club-houses belonging to civil sailing clubs which, together with the R.A.F. Hendon S.C., comprise the Welsh Harp Sailing Association. Some months ago R.A.F.S.A. and R.A.F. Hendon S.C. enthusiasts decided it was time they had a "pukka" club-house which could hold up its head with its neighbours. With the help of money donated by the R.A.F. Sports Board, under whose auspices all organized sports in the Air Force are run, several officers, airmen and airwomen got to work to build the club-house of which they are today proud.

Working in the evenings after their day's work at the Air Ministry or at R.A.F. Hendon, was over, and at week-ends, and using largely "scrounged" materials, they constructed what today resembles far more the work of artisans than of a handful of amateur builders. Spacious inside, the one-storey building is neat and solid of appearance. It has a large club-room which can be divided into two rooms with the use of folding doors, a sail and gear loft, changing rooms for men and women with modern appointments, and a gas-fitted, aluminium-lined kitchen, or galley, where members may cook snacks and brew tea or coffee. Incandescent gas burners give excellent illumination, and attractive curtains drape windows which admit plenty of light and afford a pleasant view of the reservoir and its green surroundings. Outside there are green lawns, surrounded by young shrubs, and near by fourteen concrete hard-standings laid down by Association members provide resting places for their dinghies.

THE BRADY CUP

Among the principal guests at the club-house opening was a kindly old gentleman from Wealdstone, Harrow, Mr. C. E. Brady, O.B.E., who has long taken a keen interest in the Royal Air Force. During and after the war he took such interest in the Air Training Corps cadets that he became known as a "father to the cadets." Mr. Brady has generously helped the R.A.F.S.A. by presenting the Brady Cup, now the annual prize for the individual dinghy racing championship, donating sums of money to the Association, and presenting it with three Fairey Firefly dinghies. He presented his cup to the winner of the 1953 Individual Dinghy Championship, Squadron Leader P. R. Lamey, of Wimbledon, and his crew, Flight Officer M. Lawrence (Women's Royal Air Force), of Falmouth, Cornwall, both of R.A.F. Home Command. The Sports Board Trophy awarded to the winner of the Inter-Command Championship went to R.A.F. Transport Command, who defeated R.A.F. Coastal Command on aggregate points. It was presented by Lady Fogarty, wife of Air Marshal Sir Francis J. Fogarty, who kindly opened the new club-house.

The all-round keenness shown by the R.A.F. sailors at Brent Reservoir is largely inspired by the Association's Commodore, Air Vice-Marshal A. W. B. McDonald, Director-General of Manning at the Air Ministry, a tireless worker for the Association and the good of R.A.F. sailing in general, and member of the 1948 British Olympic sailing team. He spends much time at the reservoir, either ashore or afloat, and, assisted by his officer and airmen committee-men, is largely responsible for the Association being the "going concern" it is today.

EFFICIENCY CERTIFICATES

All R.A.F. sailors at Brent Reservoir, as are all sailing members of other R.A.F. sailing units associated with the R.A.F.S.A., are eligible to take the Association's "A" and "B" sailing efficiency certificates, now recognized throughout the R.A.F. As a safety precaution, no Air Force yachtsmen are permitted to sail unless they have passed a swimming test. A former R.A.F. airborne lifeboat with outboard motor serves both the Welsh Harp S.A. and the R.A.F.S.A. as a committee and sightseeing craft.

While the R.A.F. at Brent sail only Firefly dinghies, the Air Force elsewhere in Britain and overseas sail many different types of boats. They include converted airborne lifeboats, *Yachting World* Cadets, several kinds of dinghies, Victory-class craft, Snipes, British Moths, whalers, Bordeaux, Sharpies, Flattees and German Lakes, International Star boats, Burling praams, Uffa Fox Red Wings, and in one case even a converted fishing boat.

And who said sailing in Britain was beyond the pockets of Service men and women? Surely it is not when, as associates of the R.A.F.S.A., Air Force personnel may sail to their hearts' content for the small annual subscription of

2s. 6d. for airwomen, cadets and apprentices, 5s. for airmen and 10s. for officers. A life subscription to the Association costs only £5 for officers and £2 10s. for others. Unit sailing clubs throughout the country are helped in many ways by the Association.

The aims of the R.A.F.S.A. are threefold: to provide sailing facilities for members of the R.A.F. and W.R.A.F. in the United Kingdom; to foster an interest in the art of sailing and boat management in the Service; and to encourage members to take part in competitive sailing by promoting individual sailing championships and inter-station, inter-command and inter-Service yacht racing. That these aims are being achieved is proved by the fact that Association membership in 1952 was fifty per cent. higher than that of 1951, and has shown a further appreciable increase in 1953.

FOOTBALL IN THE R.A.F.

BY SQUADRON LEADER G. A. HADLEY (*Retired*)

IT was on 1st April, 1918, that the Royal Flying Corps became the Royal Air Force, and in the following year the Royal Air Force Football Association was given the status of a County Football Association, thus bringing the junior Service on a level with the Army and Royal Navy and, as a result, entitling it annually to appoint a representative to the Council of the Football Association.

Not surprisingly, football is the most popular sport in the Royal Air Force, and every possible encouragement is given to foster and develop the game, not only in the United Kingdom, but also in all Royal Air Force stations in overseas commands. Almost without exception every station has at least one team, and on the larger stations there are as many as twenty to thirty teams. In these cases stations run their own leagues and cup competitions.

Naturally, there is always keen competition to secure a place in the station's first team, especially as it is recognized to be one of the ambitions of every officer and airman to play for his station.

Almost every station in the United Kingdom takes part either in local Service or civilian league and cup competitions in addition to entering either the Royal Air Force Challenge Cup Competition or the Royal Air Force Junior Challenge Cup Competition. The former is open to all stations at home, but the latter is restricted to those stations with an establishment of 500 or less.

As stations in Northern Ireland, Scotland and Wales enter for both competitions, the draw for the early rounds is made on a regional basis. Between one and two hundred stations enter for each competition, and they arouse tremendous keenness and enthusiasm. The finals are played before large crowds in ideal surroundings at the Royal Air Force Stadium, Uxbridge, when the competing teams often have to travel long distances. Last year, for instance, the two finalists of the Royal Air Force Challenge Cup Competition were R.A.F. Kinloss, Morayshire, and R.A.F. St. Mawgan, Cornwall, these two stations being situated approximately 800 miles apart.

Another competition which has been sponsored by the Royal Air Force Football Association, and has proved most successful, is the Boy Entrants' and

Aircraft Apprentices' Challenge Cup Competition. Some twelve teams compete in this competition, which gives a great deal of pleasure to the apprentices and boys who are fortunate enough to gain a place in their station team. The play in this competition usually reaches a high standard, and it is interesting to note that many of the participants in these games have eventually been selected to play for the Royal Air Force representative team.

Of all the football played in the Royal Air Force each season the paramount interest is the Inter-Services Championship, when the representative team play the Royal Navy and the Army. The tournament was first played in the season 1919-1920, and but for the war years has continued uninterrupted ever since. During this period the Royal Air Force has won the championship on six occasions, the last occasion being this year, when the representative team achieved its greatest victory ever. This happened when beating the Army 6—0 at Wolverhampton, having beaten the Royal Navy 2—1 at Reading. It was the Army's heaviest Service defeat for twenty years, and it was also the first occasion on which the Royal Air Force has scored more than four goals against them. The captain of the Royal Air Force team was Aircraftman J. Mudie who, it will be remembered, was a member of the Blackpool side, which won the F.A. Cup at Wembley this year. Another member of the team was J. Hubbard, who played for Glasgow Rangers when winning the final of the Scottish Cup.

The representative team receives many invitations to play matches on the Continent, and since the war has taken part in very enjoyable fixtures with the French and Belgian Air Forces. This year the team visited Yugoslavia, when a match against the Partizan Club was played in Belgrade.

During the war years the Royal Air Force fielded an all-International team, including such world-renowned players as S. Matthews, S. Mortensen, T. Drake, B. Williams, E. Hapgood, L. Scott, W. Crayson, R. Carter, P. Doherty, S. Bartram, G. Hardwick, B. Joy, and a member who accompanied the team was Squadron Leader T. Whittaker, M.B.E., now Manager of the Arsenal Football Club.

For those who may be interested in controlling a match, in other words "refereeing," this is amply catered for in the Royal Air Force. On the majority of stations facilities exist for training under qualified referees. Examinations are held at frequent intervals and a certificate is issued by the Royal Air Force Referees Committee to those who pass the required examination. This enables a referee to control any match on an R.A.F. Station; further, all County Associations accept the Royal Air Force Referees' Certificate. There are Referee Sub-Committees in B.A.F.O., Egypt, Malta and Singapore, and the same facilities exist for training candidates to become qualified referees.

Winners of the R.A.F.F.A. Junior Challenge Cup (Instituted 1923-24).—1952-53: No. 5 P.D.C., Lytham.

Winners of the R.A.F.F.A. Challenge Cup (Instituted 1920-21).—1952-53: R.A.F. Cosford.

Winners of the Inter-Command Challenge Cup.—1952-53: Technical Training Command.

Winners of the Inter-Services Championship (Instituted 1923-24).—1952-53: Royal Air Force.

THE ROYAL AIR FORCE MODEL AIRCRAFT ASSOCIATION

THE R.A.F.M.A.A. was formed on 24th October, 1949, at Air Ministry, under the chairmanship of Group Captain Pearce—the result of a policy letter written by Squadron Leader R. B. Lord to Headquarters, No. 23 Group, stressing the need for a central organization to co-ordinate and stimulate the model aircraft clubs already in existence in the Royal Air Force.

As the flying of all model aircraft is controlled by the Society of Model Aeronautical Engineers, the body delegated by the Royal Aero Club to control national and international contests in Great Britain, it was to them the newly formed association turned for advice in negotiating the £25,000 third party insurance indemnity required by the Air Ministry. In March, 1950, this was achieved, as well as the Association's second aim—that of affiliation to the S.M.A.E.

In May, 1950, a Competition Secretary was elected to the Executive Committee, and a start made to organize a contest programme featuring Command elimination contests and culminating in the first R.A.F. Championships at Halton on 23rd September. Technical Training Command won, and some 100 modellers took part.

This meeting was attended by Air Marshal Sir R. Victor Goddard, K.C.B., C.B.E., Air Member for Technical Services on the Air Council, who presented the prizes and showed such interest that he stayed late to do so. Among other interested spectators were Air Chief Marshal Sir Hugh P. Lloyd, K.C.B., K.B.E., M.C., D.F.C., LL.D. (the first President of the Association), Air Chief Marshal Sir John W. Jones, K.C.B., C.B.E., Air Officer Commanding-in-Chief, Technical Training Command, Air Vice-Marshal R. O. Jones, C.B., A.F.C., B.A., D.I.C., M.I.Mech.E., A.F.R.Ae.S., Air Officer Commanding, No. 24 Group, and Air Commodore North Carter, C.B., D.F.C., the Air Officer Commanding, R.A.F. Halton, who gave permission for the use of the airfield.

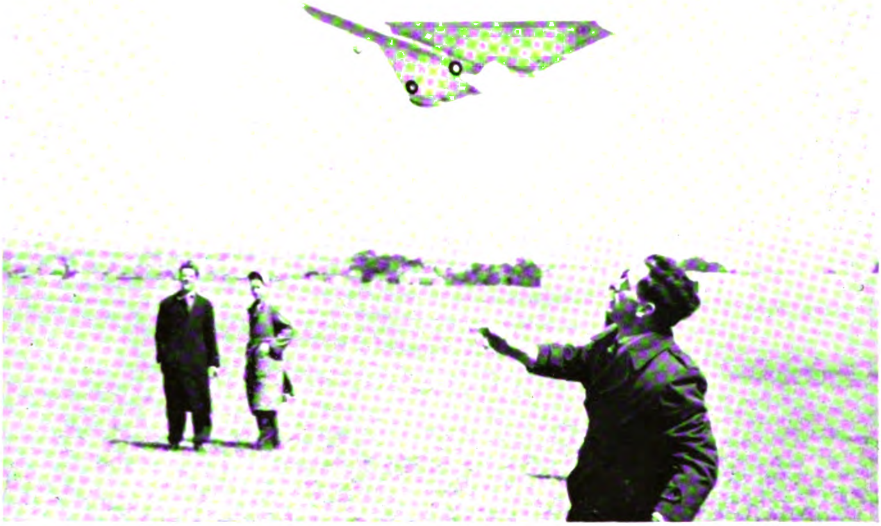
By now the flying of model aircraft was fast becoming officially recognized as a sport in the Royal Air Force, due to the support of the Association's President, Air Chief Marshal Sir Hugh P. Lloyd, who in a letter to all Commanders-in-Chief emphasized the educational and sporting aspects of this hobby.

During 1951 more clubs were formed in all Commands at home and overseas, there now being some sixty-five in the United Kingdom, twelve in B.A.F.O. and ten in overseas theatres.

A separate Competition Committee had been formed to organize the 1951 Championships, which were held at Coningsby and occupied two days of competition flying in fourteen different events.

Supplies to meet the growing demand of R.A.F. modellers were now made available through N.A.A.F.I., and the Association produced its first small handbook.

The Association continued to grow steadily throughout 1952, adopting as its charter ". . . to foster interest, inventiveness and skill in designing, building and flying model aircraft, and, by means of organized competition among all members of our Service, it is hoped that not only those whose privilege it is to fly, but those whose duties be elsewhere, may experience the science and art of flying."



A striking photograph of the launching of his model delta-wing aircraft by Squadron Leader Ellis of R.A.F. Debden, at the R.A.F. Model Aircraft Association's United Kingdom Championships at St. Athan. This fine model flew exceptionally well with a scale performance.

Left to Right: Group Captain A. A. Saw, Air Chief Marshal Sir Hugh P. Lloyd, K.C.B., K.B.E., M.C., D.F.C., LL.D., Air Marshal Sir Dermot A. Boyle, K.C.V.O., K.B.E., C.B., A.F.C., and Air Commodore J. D. Baker-Carr, C.B.E., A.F.C., at the United Kingdom Championships of the Royal Air Force Model Aircraft Association at St. Athan.

As all model aircraft flying is controlled by the Society of Model Aeronautical Engineers it was logical that the influence of this body would be felt within the R.A.F.M.A.A. and would result in close co-ordination and liaison on all model aircraft activities. This has resulted in mutual recognition and the presentation of some valuable trophies for award annually by civilian bodies, the more notable being the Thurston Trophy presented by Dr. A. P. Thurston, M.B.E., D.Sc., the Aeromodeller Trophy presented by the Directors of *Aeromodeller*, the Model Aircraft Trophy presented by Percival Marshall Co. Ltd., and the Wilmot, Mansour Challenge Trophy presented by Wilmot, Mansour & Co. Ltd.

In 1953 the R.A.F.M.A.A. Championships were held at R.A.F. Station, St. Athan, where for two days over 200 modellers representing all Commands flew in seventeen different events. The standard of construction was extremely high, and ranged from an original flying broomstick, complete with witch, entered in the Unorthodox Event, to a modified Avro Vulcan powered by a diesel engine. Among interested spectators were Air Marshal Sir Dermot A. Boyle, who has just become President of the Association, and the retiring President, Air Chief Marshal Sir Hugh P. Lloyd.

The eventual winners of the Inter-Command Challenge Shield were Maintenance Command (224 points), followed by Technical Training Command (115 points), Fighter Command (106 points), Coastal Command (49 points), Flying Training Command (48 points), Bomber Command (42 points), Transport Command (40 points), Home Command (14 points), 90 Group (7 points).

The 1952-53 season opened with forty-two clubs affiliated to the Association and closed with 110, of which eighty-eight were in the United Kingdom, twelve in the 2nd T.A.F., eight in the Middle East and two in the Far East. These clubs represent at least 3,000 active modellers, of which over 1,000 took part in the Station, Group and Command competitions.

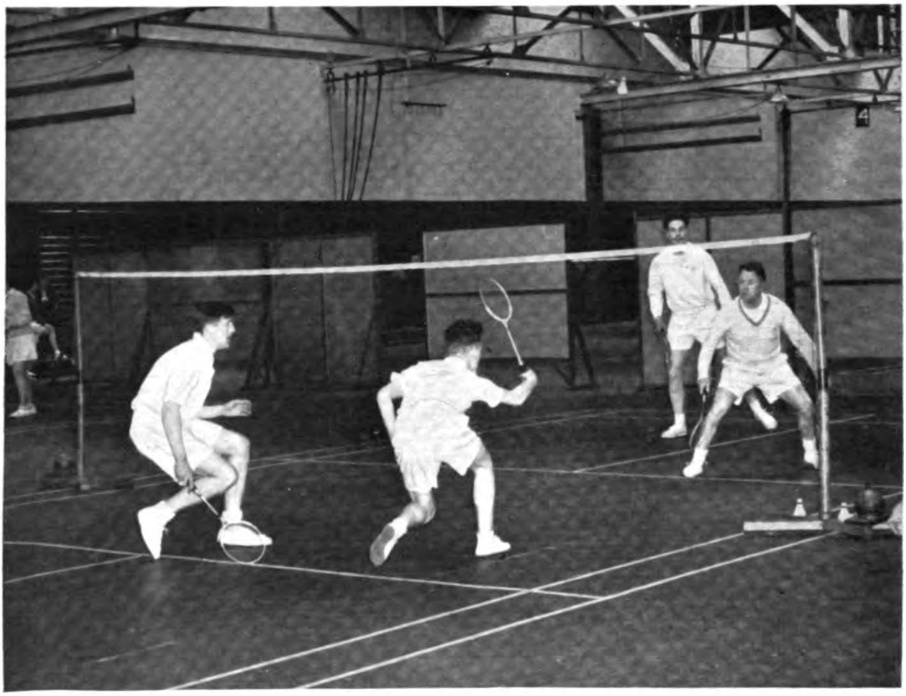
During the year the Association sponsored demonstration models for exhibition purposes, and these were featured in recruiting displays with considerable success. The most striking exhibit was a scale model Hawker Hunter constructed at R.A.F. Station, St. Athan, under the direction of Group Captain A. A. Saw, the Association's present Chairman, who, with the assistance of a technical team, produced a striking model powered by compressed air and with a built-in noise simulator. This model was under full control and took off from a model airfield, retracted its undercarriage and flew round in a most realistic manner.

There is no doubt that from its formation in 1949 the Association has successfully overcome all initial difficulties and is now firmly established. There is ample evidence of increasing support each year, and the 1954 Championships may be looked forward to with every confidence.

(Relevant Air Ministry Orders: A.468/51, M.513/52.)

R. B. L.

ROYAL AIR FORCE BADMINTON ASSOCIATION



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INTER-COMMAND FINALS AT ST. ATHAN

From left to right; Cpl. Warwick and Cpl. Shaw (Technical Training Command), Flying Officer Redfern and Flight Lieutenant Cussen (Flying Training Command).

THE season has now got well under way and by the time this article is published the Individual Championships will have been played at R.A.F. St. Athan, in South Wales. The accompanying photograph shows a match in progress on one of the six courts at St. Athan between Flight Lieutenant O. A. Cussen, D.F.C., the present Match Secretary of the Association, partnered by Flight Lieutenant R. H. McV. Redfern, now at R.A.F. Debden on the Specialist Signals Course, against Corporal John Shaw, who has several times represented England at badminton, and his partner, Corporal Warwick, who has played for the Royal Air Force team.

The first match of the season was played on 7th November, on the rackets courts, Portugal Place, in Cambridge, against the University and resulted in a win for the Royal Air Force team by 9 matches to 4. Included in the University team were Johnny Heah, a prominent Malayan player, and Basil Richards, a former R.A.F. player, now reading history at Queens'. It is hoped to play a return fixture on an R.A.F. station on 6th February.

Other matches arranged so far include for the second team one against South Wales on 21st November immediately following the Individual Championships, and against Norfolk at Norwich on 19th December. As well as these matches it is hoped that a team of twelve players will go to Denmark in April to play, amongst other games, a match against the Danish Services. An invitation has been received to make this visit from Hr. K. Braasch, the Chairman of the Charlottenlund Badminton Klub. A previous visit to this club in 1952 proved to be a huge success and the Royal Air Force team won two of the three matches played, including a decisive win over the Danish Services. Also several players reached the final stages of the two tournaments organized in the R.A.F.'s honour.

It is pleasing to be able to report that this season more than 120 stations have affiliated to the Association—an addition of some fourteen to those of the 1952-53 season. Affiliations have increased each year since the Association was formed in 1947, and it is hoped that this trend will continue. Even stations where facilities are practically non-existent seem to be able to find some space to put up a court, hire local civilian halls, or join in on the courts of near-by stations.

The Inter-Command Championships take place in January. Technical Training Command are the present holders of the trophy and have won it four times out of the six competitions so far held. It is to be hoped that one of the other Commands will this season become Champion Command, rather than have Technical Training begin to think they are invincible!

Match results (R.A.F. first):

Lockwood and Grinstead beat Heah and Sapru, 15—12, 15—16; beat Richards and Callow, 15—10, 11—15, 15—7; beat Cormie and Vanaplux, 18—14, 18—16.

Kniveton and Ciniglio lost to Heah and Sapru, 15—8, 8—15, 8—15; beat Richards and Callow, 15—8, 7—15, 15—5; beat Cormie and Vanaplux, 15—4, 15—5.

Morland and Cussen lost to Heah and Sapru, 17—18, 7—15; beat Richards and Callow, 4—15, 15—9, 15—1; beat Cormie and Vanaplux, 15—3, 15—5.

Turner lost to Baht, 7—15, 2—15; beat Hunter, 15—2, 15—1.

Warwick lost to Baht, 4—15, 9—15; beat Hunter, 15—11, 15—1.

NOTICE TO HON. SECRETARIES OF SPORTS ASSOCIATIONS

Increased interest and, in consequence, increased support is undoubtedly achieved by submitting articles and pictures of recent activities in your particular sport, for publication in this journal. Articles and pictures for the April number should be sent to:

THE EDITOR,
"AIR POWER,"
MESSRS. GALE & POLDEN LTD.,
ALDERSHOT

by 15th FEBRUARY, 1954. Contributors will receive remuneration.

CONCERNING ROYAL AIR FORCE PERSONNEL

HONOURS AND AWARDS

Her Majesty The Queen has been graciously pleased to approve the following awards in recognition of distinguished service in Korean operations:

DISTINGUISHED FLYING CROSS

Squadron Leader John Thornton Ormston, R.A.F.
Flight Lieutenant Dennis Harry Clarke, R.A.F.
Flight Lieutenant Kenneth John Wells, R.A.F.
Captain Peter Fitzmaurice Wilson (The Buffs).
Captain Peter Joseph Angwyn Tees (Royal Canadian Artillery).
Captain Kenneth Perkins (Royal Artillery).

DISTINGUISHED FLYING MEDAL

Sergeant Eric Charles Webber Tait, R.A.F.
Staff Sergeant John Charles Rolley (The Glider Pilot Regiment).

(The following United States decorations for Royal Air Force personnel who flew in Korea, conferred by the President of the United States of America). Her Majesty The Queen has given authority for the acceptance, and granted unrestricted permission for the wearing of these decorations.

DISTINGUISHED FLYING CROSS

Squadron Leader John Robert Baldwin, D.S.O., D.F.C., A.F.C. (missing).
Squadron Leader Stephen Walter Daniel, D.S.O., D.F.C.
Flight Lieutenant John Moreton Nicholls, D.F.C.

BRONZE STAR MEDAL

Squadron Leader Victor Bretton de la Perrelle.

AIR MEDAL

Squadron Leader William Harbison.
Squadron Leader Roy Emile Lelong, D.F.C.
Squadron Leader Maxwell Scannell, D.F.C., A.F.C.
Squadron Leader Brian Joseph Spragg, D.F.C.
Flight Lieutenant Colin Ian Blyth, D.F.C., A.F.C.
Flight Lieutenant Francis Easley.
Flight Lieutenant Rex Knight.
Sergeant Reginald Leslie Robert Lamb (deceased).

PROMOTIONS

Air Chief Marshal Sir Francis J. Fogarty, K.C.B., K.B.E., D.F.C., A.F.C.

Air Chief Marshal Sir Ronald Ivelaw-Chapman, K.C.B., K.B.E., D.F.C., A.F.C.

APPOINTMENTS

Among the appointments announced by the Air Ministry since the issue of the October, 1953, number of this Journal are the following:

AIR MINISTRY

Air Vice-Marshal C. E. Chilton, C.B., C.B.E., as Assistant Chief of the Air Staff (Policy).

Air Commodore N. C. Hyde, C.B.E., as Director of Operations (2).

Air Commodore B. D. Nicholas, C.B.E., as Director of Radio Engineering.

Air Commodore E. S. Butler, O.B.E., as Director of Organization.

Air Commodore W. A. Stagg, C.B.E., as Director of Equipment.

Dr. O. G. Sutton, C.B.E., D.Sc., F.R.S., J.P., as Director of the Meteorological Office.

AIDE-DE-CAMP TO HER MAJESTY THE QUEEN

Group Captain Patrick Hunter Dunn, C.B.E., D.F.C.

BOMBER COMMAND

Air Vice-Marshal J. G. Elton, C.B.E., D.F.C., A.F.C., as Air Officer-in-Charge of Administration.

FIGHTER COMMAND

Air Commodore W. J. Crisham, C.B., C.B.E., as Air Officer Commanding No. 12 Group.

FLYING TRAINING COMMAND

Air Commodore J. R. Mutch, C.B., as Senior Technical Staff Officer.

TECHNICAL TRAINING COMMAND

Air Commodore R. J. P. Morris, as Commandant of No. 2 School of Technical Training, Cosford.

Air Commodore G. N. E. Tindal-Carill-Worsley, C.B.E., to command No. 1 School of Technical Training, Halton.

HOME COMMAND

Air Commodore R. L. Kippenberger, C.B.E., as Air Officer Commanding No. 64 (Northern) Group.

ROYAL AIR FORCE STAFF COLLEGE (BRACKNELL)

Air Vice-Marshal D. MacFadyen, C.B., C.B.E., as Commandant.

UNITED KINGDOM SERVICE LIAISON STAFF, CANADA

Air Commodore D. N. Roberts, O.B.E., A.F.C., as Senior Air Liaison Officer.

ADEN

Air Vice-Marshal S. O. Bufton, C.B., D.F.C., as Air Officer Commanding British Forces.

GROUP CAPTAINS' APPOINTMENTS

Group Captain L. T. Keens, O.B.E., to Headquarters Allied Air Forces, Central Europe, for staff duties.

Group Captain J. D. Melvin, to Headquarters Middle East Air Force for administrative staff duties.

Group Captain H. E. C. Boxer, O.B.E., to Air Ministry for duty in the Department of the Chief of the Air Staff.

Group Captain D. D. Christie, O.B.E., A.F.C., to Headquarters 2nd Tactical Air Force for administrative staff duties.

Group Captain R. H. E. Emson, C.B.E., A.F.C., to Air Ministry for duty in the Department of the Chief of the Air Staff.

Group Captain H. B. Collins, to Headquarters No. 206 Group, Middle East Air Force.

Group Captain W. N. Hibbert, to Headquarters Maintenance Command for administrative staff duties.

Group Captain H. Crowther, to Headquarters Bomber Command for administrative duties.

Group Captain G. M. Gillan, to Air Ministry for duty in the Department of the Chief of the Air Staff.

Group Captain E. L. Colbeck-Welch, O.B.E., D.F.C., to Air Ministry for duty in the Department of Air Member for Personnel.

Group Captain K. W. Niblett, D.F.C., to R.A.F. Aldergrove to Command.

Group Captain D. I. Coote, C.B.E., to Headquarters Bomber Command for administrative staff duties.

Group Captain K. R. Coates, to Headquarters No. 66 Group for Air Staff duties.

Group Captain A. H. Donaldson, D.S.O., D.F.C., A.F.C., to Headquarters No. 2 Group, 2nd Tactical Air Force for Air Staff duties.

Group Captain K. Slater, O.B.E., A.F.C., to Air Headquarters Malaya for Air Staff duties.

Group Captain J. A. C. Stratton, C.B.E., to Headquarters Allied Forces, Southern Europe.

Group Captain M. H. Rhys, A.F.C., to Headquarters Far East Air Force for Air Staff duties.

Group Captain S. L. Ring, D.F.C., to Ministry of Supply.

IMPERIAL DEFENCE COLLEGE COURSE, 1954

Royal Air Force officers selected for the 1954 course are: Air Commodore H. H. Chapman, C.B.E., A.M.I.E.E., Air Commodore D. G. Morris, C.B.E., D.S.O., D.F.C., Air Commodore M. L. Heath, O.B.E., Group Captain A. A. Adams, D.F.C., Group Captain W. MacI. King, Group Captain H. J. Kirkpatrick, C.B.E., D.F.C., Group Captain W. E. Oulton, C.B.E., D.S.O., D.F.C., Group Captain D. S. Radford, D.S.O., D.F.C., A.F.C., A.D.C., Group Captain C. Scragg, C.B.E., A.F.C.

In addition Air Commodore I. D. McLachan, D.F.C., of the Royal Australian Air Force, and Air Commodore L. E. Wray, O.B.E., A.F.C., C.D., of the Royal Canadian Air Force, will also attend the 1954 course.

RETIREMENTS

Sir Nelson Johnson, K.C.B., D.Sc., A.R.C.S., who has held the post of Director of the Meteorological Office for the past fifteen years.

LETTERS TO THE EDITOR

Headquarters No. 83 Group,
2nd Tactical Air Force,
Royal Air Force

DEAR SIR,

Flight Lieutenant F. L. Long's interesting article on Soviet affairs contains a useful analysis of the organization of State and Party in the U.S.S.R., but the conclusions drawn in the last but one sentence, "We shall see not a weaker but a stronger Russia; not more freedom within her frontiers, but less; not a régime with a softer and more benevolent face, but one with a harder and even more brutal outline," would appear to be in the nature of a *non sequitur*. Logically speaking, there is nothing in the foregoing text of the article to warrant such conclusions, and the writer seems to have fallen into the same error of "fantastic" speculation as he condemns in the popular Press. I need hardly add that his forecast accords ill with events since he wrote the article.

It is generally recognized by students of the subject that Russia's policy, whether foreign or domestic, is based on considerations of expediency and that any speculation as to how this or that internal change is likely to affect the rest of the world must necessarily be hazardous. However, those of your readers who are interested in the doubtful practice of speculation on this vital and fateful problem will find some pointers in two important books of recent publication, Deutscher's "After Stalin" and Ebon's "Malenkov," and in the valuable commentaries, "Through Soviet Eyes," which appear in the columns of *The Times*.

Yours faithfully,
A. C. KERR,
Squadron Leader, Royal Air Force.

Royal Air Force College,
Cranwell,
Sleaford

DEAR SIR,

I read Squadron Leader Kerr's letter with interest, but am afraid that I must stand by the analysis made in THE QUARTERLY last July. A careful reading of my article will reveal nothing "in the nature of a *non sequitur*"; if the picture I draw of the Bolshevik dictatorship is correct, then the conclusion in the penultimate sentence follows automatically. If your correspondent feels that the basic conception is wrong, perhaps he would care to indicate where it is at variance with the facts?

To take a single sentence from its context in an article running to nearly six pages is, in any event, a dangerous thing to do and may create the impression that the analysis *as a whole* is incorrect, or worse, based on the private whims of the author. Admittedly, since it was made at the end of April, 1953, not eight weeks after Stalin's death (itself a momentous event in the history of the U.S.S.R.) my analysis has been affected, in parts, by the passage of time. In those parts the perspective is possibly foreshortened. But to state, as your correspondent does, that my "forecast accords ill with events" is neither fair nor justified by the known facts. On what grounds, apart from secondary evidence, does your correspondent make this statement? For my part I think I can say that since

1945 I have read all the relevant documents published on the Soviet side—the most valuable material, incidentally, from which inferences may be drawn—and can see very little, even now, to support the popular and, I believe, erroneous view that the character of the Bolshevik dictatorship is on the point of changing, or has already changed. It is always possible that it *may* do so. The world might be a happier place, possibly, if it did. But the signs, I must repeat, are lacking at the moment.

To comment adequately on the second paragraph of your correspondent's letter would involve an examination of the recently published books of Mr. Deutscher and Mr. Ebon, and this is not, I feel, the proper place for such an examination. I am nevertheless surprised that your correspondent so unreservedly recommends Mr. Deutscher's hastily contrived book or Mr. Ebon's which, though informative, suffers from the fault of most books purporting to offer the general public biographies of the Soviet leaders. Is it, one wonders, possible to say anything really useful about the lives of these men? And what "pointers" has your correspondent particularly in mind? No one, however, would wish to quarrel with the estimate of the excellent series in *The Times* entitled "Through Soviet Eyes," though one should, I think, always remember that even this series, useful though it is, cannot provide readers with more than the smallest fraction of the total information available. A student of the subject, as I am sure your correspondent will agree, will seek something more substantial on which to base his judgments.

Yours faithfully,

JOHN F. L. LONG,

Squadron Leader, Royal Air Force.

(*An unsolicited testimonial to the Royal Air Force*)

Isabel la Católica 428,
Buenos Aires
República Argentina

DEAR MR. EDITOR,

I am a reader of THE R.A.F. QUARTERLY, where I find all that interests me about planes, I am, at the same time, an enthusiast of aviation and particularly of the Royal Air Force and I have followed its development since pre-war and the glorious days of "The Battle of Great Britain" until the present time when the R.A.F. has the most powerful and up-to-date jet fighters.

That is why I write this letter to you wondering if it would be possible for you to help me: all I want to know is what I must do to obtain a pennant or a badge of the R.A.F. because it is my desire to get what I request, to have a remembrance of that branch of Great Britain's armed forces seeing that I cannot be a member of it.

I do not know what you will think after reading this, but I thank you for all the information that you can give me about this.

I hope to hear from you soon.

Yours truly,

LORENZO A. PASTORINO.

[A suitable memento was dispatched by the Editor.]

CURRENT EVENTS

Presentation of the Esher Trophy

The Earl of Limerick, Chairman of the Council of the Territorial and Auxiliary Forces Associations, presented the Esher Trophy to Squadron Leader J. E. Storrar, D.F.C., Officer Commanding No. 610 (County of Chester) Squadron, Royal Auxiliary Air Force, at R.A.F. Hooton Park, Cheshire, on Saturday, 10th October, 1953.

Lord Limerick congratulated the Squadron on its remarkable achievement, and said it was a great pity that Air Commodore I. R. Parker was unable to be present to see the Squadron, of which he was the first Commanding Officer, on its day of victory.

The presentation was followed by a march past of the Squadron and a fly past by twelve of the Squadron's Meteor 8 aircraft.

The Esher Trophy is awarded annually to the most efficient fighter squadron of the Royal Auxiliary Air Force, and this was the first time it had been won by the Chester Squadron.

Squadrons are judged on the operational efficiency maintained during the year while carrying out the Fighter Command training syllabus, points being awarded for hours flown by day and night, instrument flying, air gunnery and freedom from accidents.

Sector commanders give marks for operational efficiency, and group commanders for general unit efficiency as shown during annual inspection. Attendance at training periods and progress of recruiting also count towards the final placings.

No. 610 Squadron was formed at Hooton Park in 1936 and was one of the fighter units actively engaged against the *Luftwaffe* during the evacuation from Dunkirk and in the Battle of Britain, operating mainly from Biggin Hill and Hawkinge (Kent).

During the following years it was engaged on a variety of tasks—fighter sweeps, intruder work, convoy escort, shipping reconnaissance and bomber escort. In the summer of 1944 No. 610 Squadron was employed against the flying bombs, destroying fifty. Towards the end of the war it became part of the 2nd Tactical Air Force.

The Esher Trophy, a bronze figure of Perseus by Sir Alfred Gilbert, was presented by the late Viscount Esher and first awarded in 1926. The competition lapsed during the war and was revived in 1949. Post-war winners have been No. 604 (County of Middlesex) Squadron, 1949; No. 603 (City of Edinburgh) Squadron, 1950; No. 616 (South Yorkshire) Squadron, 1951.

Gordon Shephard Memorial Prize Essay, 1953-1954

The subject originally announced for this Essay Competition has now been changed and the following subject substituted: "The increasing complexity of modern weapons is demanding an ever greater degree of specialization than in the past. Discuss the effect of this trend on the training of officers in the General Duties Branch and suggest how the opposing requirements of specialization and wide experience can best be resolved."

The competition is open only to serving members of the Royal Air Force and entries must reach the Air Ministry (D.S.T.), Richmond Terrace, London, S.W.1, by 30th April, 1954, from whom further details of the competition can be obtained.

The prizes offered for this competition, subject to the requisite standard being reached are as follows:

1st Prize	50 guineas
2nd Prize	30 guineas
3rd Prize	20 guineas

A fourth prize of ten guineas may also be awarded if the standard of entry warrant it.

The competition for 1952-1953 was won by Flight Lieutenant J. B. L. Bunce, M.A.; second was Wing Commander J. E. T. Haile; and third Wing Commander C. N. Foxley-Norris, D.S.O.

The Mobility of Air Force Staff Officers

The old term of "chair-bound" for staff officers has for many years been challenged by the extreme mobility of at least those in our air forces.

In recent months the policy of "see for yourself" and "keeping-in-touch" with events in far distant countries has been exemplified by Air Marshal Sir Ronald Ivelaw-Chapman, K.B.E., C.B., D.F.C., A.F.C., Vice-Chief of the Air Staff, who completed a 25,000 miles tour, during which he had discussions with the Commonwealth Air Force authorities in Australia and New Zealand, visited Ceylon. units of the Far East and Middle East, dropping in on his tour to see the Commanders-in-Chief of the Indian Air Force and the Royal Pakistan Air Force. His visits were by no means limited to headquarters, as he included in this extensive tour isolated units of the M.E.A.F. and F.E.A.F., where small Royal Air Force detachments were stationed. Among these were lesser known, such as Car Nicobar, in the Indian Ocean, and Mesirah, off the South Arabia coast.

Air Chief Marshal Sir John Whitworth Jones, K.C.B., C.B.E., Air Member for Supply and Organization, also made an extensive tour of units in the Middle East, visiting Malta, Fayid, El Adem, Entebbe, Eastleigh (Nairobi) Aden, Mafraq, Amman, Habbaniya (Iraq), Cyprus and Gibraltar, between 2nd November and 17th November.

Those with experience of life at the Air Ministry will appreciate that files, meetings and conferences involving a vast "paper war" have to be dealt with in addition to the vital visits to units scattered across the face of the earth. It is now all part of the day's work of a Royal Air Force staff officer, demanding a high standard of physical fitness.

Cosford's Biggest-ever Boy Entrant Intake

The biggest ever intake of recruits to the R.A.F., under the boy entrants' training scheme, reported to R.A.F. Station, Cosford, on 19th October, for attestation. Well over 500 youths between the ages of fifteen and seventeen and a half, who are making their careers in the R.A.F., began three months' basic service and educational training prior to learning their skilled R.A.F. trade.

The concentration of all boy entrant training at Cosford will result in three intakes every year of similar proportions. Some three weeks prior to each intake upwards of 1,000 candidates for entry into the R.A.F. under the boy entrants' scheme spend forty-eight hours at Cosford, during which time they are interviewed, medically examined and given aptitude and educational tests. Selected candidates are interviewed by specialist officers—many of whom commenced their R.A.F. service as apprentices—who place the recruits in the trade of their choice to which they are most suited.

Each intake has vacancies for airframe, engine, instrument, electrical, air radar, ground wireless, armament and air wireless mechanics and telegraphists and cooks. The training course lasts for eighteen months. The new intake included the first course of boy cooks.

Canberras in 1953 London—Christchurch (N.Z.) Air Race

Some extremely fast turn-round times at the various staging points, the establishment of three new point-to-point records by R.A.F. aircraft, terrific speeds averaged over certain sections of the race and technical troubles which nullified actual refuelling records by ground crews along the route, were logged by the three English Electric Royal Air Force Canberra jet photo-reconnaissance and two Royal Australian Air Force Canberra jet bomber aircraft which competed in the speed section of the 1953 London to Christchurch, New Zealand, air race.

The R.A.F. Canberras took first, third and fourth places in the gruelling 12,270-mile race, with the R.A.A.F. entries capturing second and fifth places. The winner, a P.R. Mark III, flown by Flight Lieutenant R. L. E. Burton, A.F.C., with Flight Lieutenant D. H. Gannon, D.F.C., as navigator, completed the course in the over-all time of 23 hours 51.07 minutes, according to official calculations of the Royal Aero Club, or 22 hours 29 minutes of actual flying time. In the process it established new point-to-point records between London and Christchurch, becoming the first aircraft in history to fly between England and New Zealand in less than a day, and London and Basrah (Iraq). Flight Lieutenant Burton flew the 2,871 miles to Basrah in 5 hours 12 minutes at an average speed of 543.9 m.p.h.

Third place went to Flight Lieutenant R. MacA. Furze, pilot, and Flight Lieutenant J. W. Harper, D.F.C., navigator, in another Canberra P.R. Mark III jet, whose over-all time for the race was 24 hours 35 minutes, of which 22 hours 36 minutes were actually spent in the air.

Fourth place went to Wing Commander L. MacD. Hodges, D.S.O., D.F.C., pilot, and Squadron Leader R. Currie, A.F.C., navigator, in a P.R. Mark VII Canberra, the first of the five Canberras to leave London Airport. The Wing Commander established a new London to Colombo (Ceylon) record, averaging 519.4 m.p.h., for the 5,509 miles.

Flight Lieutenant Burton, after being refuelled in under ten minutes by the R.A.F. ground servicing party at Shaibah, who for weeks had been practising turn-around techniques and, when they handled the Canberras in the actual race, beat the times they had clocked in practice, was delayed thirty minutes at Shaibah with brake trouble, but got through Ratmalana, Ceylon, in fifteen minutes without incident. At the Cocos Islands, technical difficulties again nullified quick refuelling, and a burst refuelling hose drenched the aircraft, which had to be dried off, increasing its turn-around time to twenty-two minutes. But when at last he did get away, Flight Lieutenant Burton really "stepped on the gas," covering the 1,840 miles across the Indian Ocean to Perth, Western Australia, at an average speed of 582 m.p.h., in 3 hours 10 minutes' flying time. He had no trouble at Perth and was off again, heading for the finishing line 3,150 miles away at Christchurch, in seventeen minutes.

Flight Lieutenant Furze, who covered the course in the over-all time of 24 hours 35 minutes, of which 22 hours 36 minutes were spent in the air, ran into worse trouble at Shaibah and Negombo than either of his colleagues. Flight

Lieutenant Burton and Wing Commander Hodges. At Shaibah he spent seventy-two tantalizing minutes on the ground after a quick refuelling, while a turbo starter was changed, and at Negombo he was delayed twenty-five minutes by a wheel change. After that his troubles were over, and he passed through the Cocos Islands and Perth in the fine turn-around times of eleven and thirteen minutes respectively. He covered the Cocos-Perth leg in exactly the same flying time as did Flight Lieutenant Burton, 3 hours 10 minutes.

It is worthy of note that the over-all turn-around times at Shaibah did not really do justice to the fine work of the ground parties there. Wing Commander Hodges was actually refuelled in eleven minutes, Flight Lieutenant Burton in nine and Flight Lieutenant Furze in eight.

Fourth place went to Wing Commander Hodges in the P.R. Mark VII Canberra. In all probability he would have won the race but for extremely bad luck at Perth, where everything hinged on a very quick turn-around. There he had a recurrence of the filler cap trouble which had delayed him thirty minutes at Shaibah, and generator trouble added to his difficulties. He was held at Perth several hours, eventually getting away about midnight to finish the course. He had taken the daring expedient of over-flying the Cocos Islands and covered the 3,611-mile leg from Negombo to Perth in 6 hours 43 minutes, an amazing piece of calculation, navigation and flying, over water the entire distance.

Australians Have Their Troubles, Too

The R.A.A.F. Canberra B. Mark XX, flown by Squadron Leader P. F. Raw, D.F.C., which, as the scratch aircraft of the speed section, left London Airport at 5.55 p.m. on October 8th, went like the proverbial "bomb" through Bahrain (Persian Gulf), Ratmalana (Ceylon) and the Cocos Islands, with phenomenally fast turn-around times at all three places. Then, at Woomera, Southern Australia, which Squadron Leader Raw chose in preference to Perth as his penultimate stopping place, he ran into trouble which cost him the race. He landed there with his nose wheel jammed and only half down, damaged his pitot-head in consequence and had to have it replaced. In addition he had trouble with his oxygen system, and for eighty-three minutes, which must have seemed like years, was grounded while, as he knew, Flight Lieutenant Burton and Flight Lieutenant Furze were racing from Perth towards the finishing line. At last he got away, however, and flashed across the Christchurch line 24 hours 32 minutes after leaving London, to take second place. He had spent 22 hours 29 minutes in actual flying time, which, it is interesting to note, was exactly the same flying time as Flight Lieutenant Burton's.

Australia's Wing Commander Cuming, piloting the other R.A.A.F. Canberra, made a tremendous early bid to win the race, and through Bahrain and Ratmalana had the splendid turn-around times of only twelve and thirteen minutes respectively. Then, landing on the coral air-strip at the Cocos Islands, he burst a main tyre and to all intents and purposes was out of the race, though he subsequently finished the course over the week-end to take fifth place.

It was apparent from the start of the race at London Airport that Flight Lieutenant Burton was all-out to win, and unlike the other two R.A.F. Canberras, which continued for some distance after the take-off before banking to port to get on to their course, Flight Lieutenant Burton was scarcely off the runway when he pulled his Canberra sharply round to gain valuable early seconds disappear quickly into the gathering evening mist.

ITEMS FROM AMERICAN SOURCES

Chairman of U.S. Joint Chiefs of Staff is an Aviator

Admiral Arthur William Radford, the Chairman of the U.S. Joint Chiefs of Staff, learned to fly in 1920 and today still flies his own aircraft. What could be more appropriate in this "air age?" He entered the Naval Academy in 1912 and on graduating in 1916 went to sea duty. Four years later, with other Naval Academy graduates, he underwent the flying training course at Pensacola and obtained his pilot's wings.

During his active period with the Naval Air Arm he served as a flying instructor, aboard a battleship, a fighter pilot aboard the first carrier (a converted collier), seaplane and land-plane pilot and on the staff in the Bureau of Aeronautics in Washington. He was catapulted from the decks of many ships—even from an improvised turret platform. He studied, investigated and tried out aerial gunnery, air-to-air refuelling, balloons, parachutes and aerobatics.

An exceptionally fine staff officer, in the 1930's he was given scope to study naval strategy, mobility and firepower. In the Second World War he earned his Rear-Admiral's two stars in charge of the U.S. Navy's expansion programme, training young men to provide the vast number of pilots required.

In 1943 he returned to sea and fought his first major action as Task Group Commander in the U.S. invasion of the Gilberts. After the surrender of Japan he returned to Washington to take part in the first tentative discussions on "unification." Whilst one of the exponents of national air power, he approaches this with the caution that his belief for the need for more inter-education for members of the military services and people imposes upon him. He advocates a prerequisite combination of naval air power, land air power, commercial air power and aircraft industrial air power as a means of *eventually* providing the most imaginative instrument of national policy. His earlier training in the Navy would undoubtedly temper his view today on air power and to him it would present a different picture to that envisaged by Seversky.

The United States of America are indeed fortunate in having as their Chairman of Joint Chiefs of Staff one who has personal practical experience of air matters—whose knowledge will be invaluable in these days when national security depends to so large an extent upon the efficiency of the nation's air arm.

U.S. "Air Force" Magazine

This is the Journal of the Air Force Association, an independent, non-profit air power organization with no personal, political or commercial axes to grind; established in January, 1946.

The objectives of the U.S. Air Force Association are to assist in obtaining and maintaining adequate air power for national security and world peace, to keep its members and the general public abreast of developments in the field of aviation and to preserve and foster the spirit of fellowship among former and present members of the United States Air Force.

This is a most interesting monthly magazine which seems to embrace the objects of The Air League and The Royal Air Force Association in Great Britain. From its contents it supports the modern conception of AIR POWER and its predominant place in the military might of any major power and its influence, if of sufficient strength, for the preservation of peace in these uneasy times of international unrest.

With its large membership of those bound together by the ties of comradeship in war, and the wide circulation of its magazine, this association can play an important part in providing adequate defence against any possible aggressor of the free peoples of the world and in so doing forge an instrument which will deter aggressive intentions and give the world that earnestly desired prospect of peace by negotiation, but by true and just negotiation *through strength*, as opposed to appeasement.

The U.S.A.F. 120 or 143 Wing Programme

When reading in the public press the controversy over the number of "Wings" considered essential in the United States national defence programme, one is apt to misunderstand what the advocates of the 143 Wing or the interim 120 Wing indicates in terms of air power strength.

In one of his many trips to Congress to justify Air Force requests for funds, the former Air Force Chief of Staff, General Hoyt S. Vandenberg explained it in this way:

"When the Navy talks about combatant ships, they do not talk about the sea train which follows it, and the Army does not talk about the Corps Artillery it has to have and the supply and quartermaster services. Therefore we want to get the Air Force on a comparable basis of combat units as a sign of what we have for a striking force, which is in consonance with what the Army and Navy did."*

The inference from this is clearly that when speaking in terms of "Wings" it is not intended to include in them experimental units, meteorological units, air rescue formations or similar non-striking force personnel and equipment. Unquestionably what is intended is "combat wings" in Strategic Air Command, Tactical Air Command and Air Defence Command. It is equally clear that as for the Army and Navy, the U.S.A.F. require the requisite background build up to supply and maintain these wings. In academic terms a combat wing is the basic operational unit which is self-sufficient and capable of sustained, efficient operation. It is a flexible organization adapted by the three major commands to fit their specific missions.

Royal Air Force Personnel co-operating with the 3rd or 12th U.S. Air Forces will have noticed some divergence from the organizations to which they are accustomed and a definition of units (taken from *Air Force Journal*, September) might be of interest.

DEFINITIONS

FLIGHT.—The basic tactical unit in the Air Force, consisting of four or more aircraft in two or more elements.

SQUADRON.—A flying unit consisting of two or more flights of aircraft or an administrative unit performing a single basic function, such as a combat squadron or maintenance squadron.

GROUP.—A flexible administrative or tactical unit composed of two or more squadrons. The term also applies to combat support and service support units.

WING.—Basic operational Air Force unit which is self-sufficient and capable of sustained efficient operation. Number of aircraft varies from seventy-five fighters to thirty heavy bombers.

DIVISION.—An air combat organization consisting of two or more wings.

AIR FORCE.—The numbered Air Force (as 3rd or 12th) is a flexible organization of varying size. Its wings may be grouped under two or more Air Divisions or directly under the numbered Air Force headquarters. Normally a numbered Air Force has a single mission; that is, strategic, tactical or defence.

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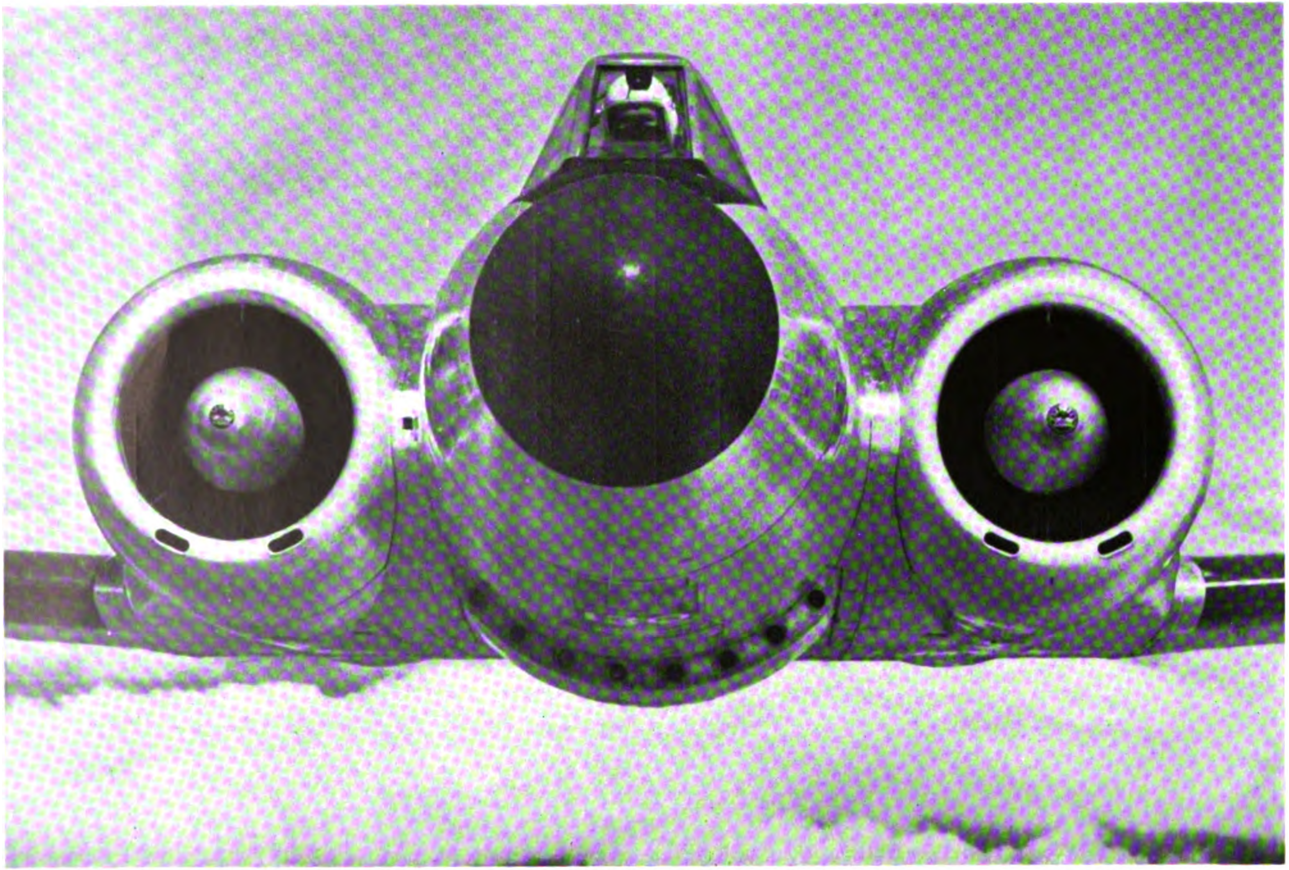
* *Air Force*, September, 1953.

THESE ARE USAF'S COMBAT WINGS

Type	*Aircraft*	*Normal Number of Aircraft*	*Approximate Personnel*
(1) Bombardment Wing (Heavy)	B-36s	30	3,600
(2) Bombardment Wing (Medium)	B-50s B-29s B-47s	45 (plus tanker squadron of 20 KB-29s. or KC-97s.)	3,000 to 3,300
(3) Bombardment Wing (Light)	B-45s B-26s	48	1,500 to 1,800
(4) Fighter-Bomber Wing	F-80s F-84s F-86s	75	1,400
(5) Strategic Reconnaissance Wing (Heavy)	RB-36s	30	4,000
(6) Strategic Reconnaissance Wing (Medium)	RB-50s RB-29s	45	3,900
(7) Strategic Reconnaissance Wing (Light)	RB-45s	45	2,900
(8) Tactical Reconnaissance Wing	RF-51s RF-80s RB-26s	48	1,500
(9) Troop Carrier Wing (Heavy)	C-54s C-124s	48	1,500 to 1,700
(10) Troop Carrier Wing (Medium)	C-82s C-119s	48	1,500

AIRCRAFT WITH NORMAL CREW COMPLEMENT

B-26	3
B-29	11
B-36	16
B-45	4
B-47	3
B-50	11
F-80	1
F-84	1
F-86	1
F-94	2
C-54	3
C-82	5
C-119	5
C-124	7



[National Defence Photo

Close-up view of CF-100 in flight at R.C.A.F. Station, North Bay, Ontario.

ROYAL CANADIAN AIR FORCE

AN OUTLINE OF ROYAL CANADIAN AIR FORCE ACTIVITIES

HUNDREDS of thousands of Canadians visited R.C.A.F. stations across Canada when the R.C.A.F. celebrated its seventh annual Air Force Day, and the Canadian public had an opportunity to see for itself how Canada's air force is rounding out its current expansion programme.

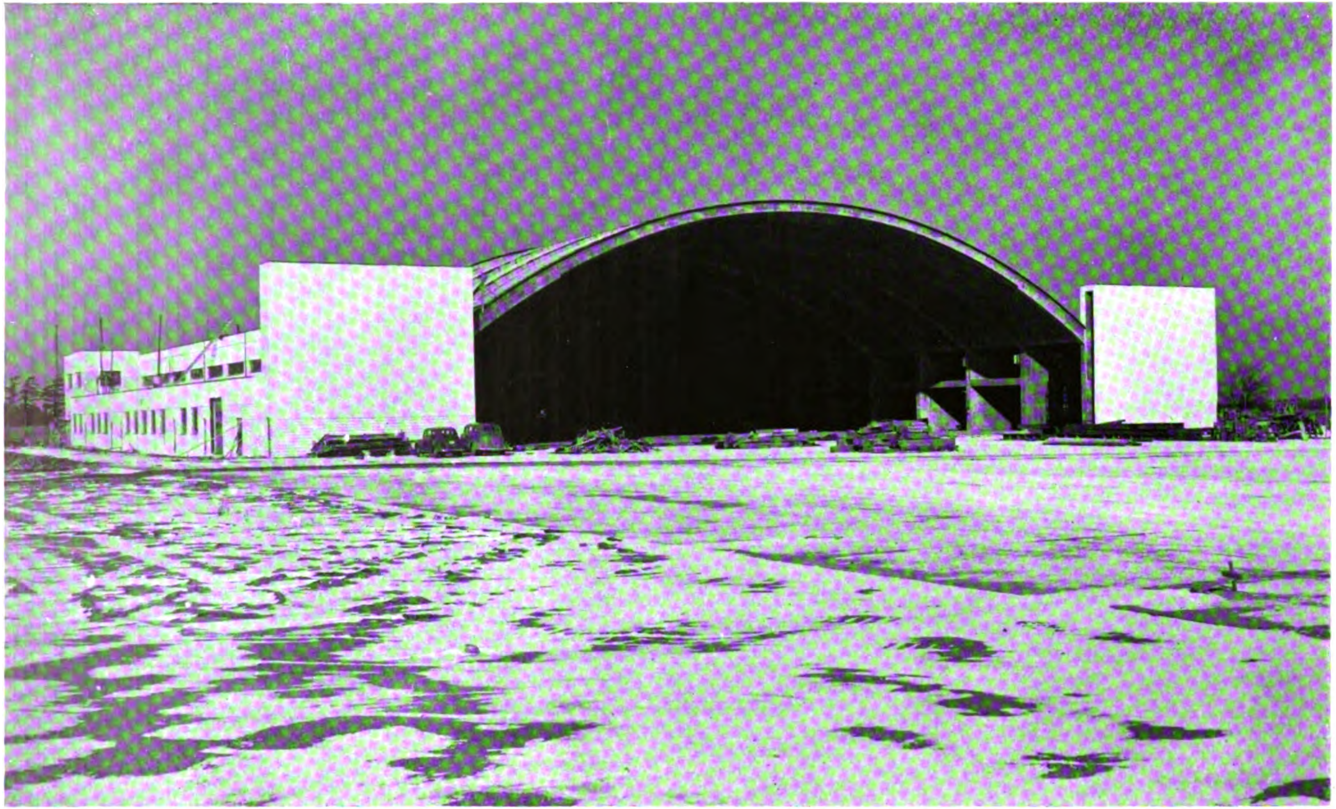
Senior R.C.A.F. officials point out that the programme is not yet completed. It's a long job and necessarily a slow one, for an organization as complex as an air force of today cannot be built up overnight. The aircraft, the early warning equipment, and the many other highly technical—and unfortunately tremendously expensive—items required take not months but years to design and produce.

Without a magic wand which would produce squadrons of aircraft and equipment with a wave, the very task of deciding what is to be obtained is a complicated and difficult one. "Calculated risk" is a term used by senior Air Force officials in describing one of the important factors involved. Development is always continuing, and in some fields, such as fighter aircraft, is particularly rapid. A decision to obtain today's aircraft or equipment for tomorrow's use could mean that the aircraft is obsolescent by the time it is received in quantity. Yet to wait for the ultimate would mean never having anything, for the ultimate is a long way away, if it exists at all, as far as the Air Force is concerned. Somewhere between these two extremes lies the answer, tempered by many factors, including money, materials, and manpower available for production of the selected item.

It's a decision that has resulted in many grey hairs at Air Force Headquarters in Ottawa, a decision that has had to be made thousands of times during the last several years, in line with the ever-increasing complexity of today's air force.

Officials at Air Force Headquarters don't pretend that the R.C.A.F. expansion has always gone smoothly. But they do feel that it has gone ahead with no serious mistakes or hindrances, and with no faulty decisions that have put it off the rails.

A decision had to be made as how best to utilize the skilled personnel who made up the immediate post-war Air Force, the ceiling for which was set at 16,000. It was decided that with the even then apparent trend in military aviation development, it would not be feasible for Canada to maintain a strategic bomber force. Rather, it was decided to concentrate on a fighter element, with maritime and transport elements also forming important parts of the Service. Tactical support operations were not to be overlooked, but it



National Defence Photo

With the expansion of the R.C.A.F., construction has kept pace with the demands for new hangars and buildings. Seen here is a cantilever hangar under construction at R.C.A.F. Station Uplands, Ontario.

was decided that strategic bomber operations would stretch the R.C.A.F.'s resources to a point where none of its operational elements would be more than a token force, packing little actual punch. This decision was made with due regard for the types of air forces maintained by our allies, and the fact that Canada was unlikely to fight a war on its own.

A glance at today's R.C.A.F. shows that the Air Force has made tremendous progress since the beginning of the current expansion programme. Two of the world's finest jet fighters, the CF-100 Canuck and the F-86 Sabre, are in production in Canada, and both are in squadron operational use.

Many other types of aircraft have been acquired during the last several years. Amongst these is the C-119 transport, which is used for airborne operations with the Canadian Army, and for other general transport operations. Built in the U.S., it has proved its worth under operational conditions in Korea. Other types include the Harvard piston-driven basic trainer, additional numbers of which have been built in Canada; the Chipmunk light trainer, used for refresher pilot training, and built by De Havilland of Canada; the Otter and Beaver, also De Havilland of Canada products, and used for search and rescue and light transport purposes; the T-33 Silver Star, a development of the U.S. Shooting Star, built by Canadair with a Rolls-Royce Nene jet engine as a power unit, and used by the R.C.A.F. as a jet trainer; and the jet Comet transport, two of which have been obtained by the R.C.A.F. to exercise the air defences with these high speed, high altitude aircraft.

Equally vital in the R.C.A.F.'s build-up is the construction programme, expected to run into a cost of $400,000,000 before completion. Stretching across Canada and into the northland, the building programme involves construction or expansion of both operational flying and training stations, supply and repair depots, command and station headquarters, radar stations, and many other essential projects.

Among the most complicated items are newly designed hangars, being built at numerous airfields. Largest of the three standard types is the cantilever model, built to house the big aircraft of today and tomorrow. Ingeniously devised, these big hangars will result in space and cost savings, as they provide much office and storage space previously requiring separate buildings.

Over-all R.C.A.F. policies are directed from Air Force Headquarters, in Ottawa, which delegates responsibilities for various operations and activities to Command and Group Headquarters across Canada.

The aerial protection of Canada is the responsibility of Air Defence Command, and an excellent over-all picture of this Command by the Air Officer Commanding was published in the April, 1953, number of this Journal.

While the formation of the remaining CF-100 squadrons for home-based operations is going on, Canada is adding the finishing touches to its N.A.T.O. force of twelve fighter squadrons in Europe. Canada promised to contribute an Air Division of twelve fighter squadrons, complete with the required logistical support units, to the supreme N.A.T.O. command in Europe, and this force is there, well ahead of schedule.

Coming under N.A.T.O. operational control, the Air Division has its headquarters at Metz, in north-eastern France. Under it come the R.C.A.F. Fighter Wings on the Continent, each located at a different base and made up of three Sabre jet fighter squadrons.

Three such Wings are now established on the Continent, at Grostenquin,

[National Defence Photo

A general view of the departure of the R.C.A.F.'s No. 4 Fighter Wing at R.C.A.F. Station Uplands, Ontario, before taking off for Goose Bay, Labrador, and thence, ultimately, to Baden-Soellingen, Germany.

in France, and at Zweibrucken and Baden-Soellingen in Western Germany. Another Wing is located at North Luffenham in England, and an Air Materiel Base is also in operation in England, at near-by Langar. The North Luffenham Wing, first of the overseas Wings to move across the Atlantic, is due to shift over to a Continental base at Marville, in France, this year. Until leaving the U.K. it comes under operational control of R.A.F. Fighter Command.

The movement of the overseas Wings has been an achievement on its own. The first two squadrons to move into North Luffenham, in late 1951 and early 1952, before a Continental N.A.T.O. base was available to house them, made the crossing by ship. The third squadron, however, flew its own Sabres across the Atlantic, by way of Goose Bay (Labrador), southern Greenland, and Iceland. This movement, known as Leapfrog One, was the first R.C.A.F. jet crossing of the Atlantic.

It was followed by even larger mass movements of R.C.A.F. jets, as the next three Wings to shift over to Grostenquin, Zweibrucken and Baden-Soellingen flew across *en masse,* following the same route.

The Air Division forms an important part of the over-all N.A.T.O. air defence forces in Europe. With similar U.S. and French formations it forms the 4th Allied Tactical Air Force, which in turn comes under the Allied Air Forces, Central Europe. R.C.A.F. officers form part of the staffs of both these N.A.T.O. command headquarters, as well as at Supreme Headquarters, Allied Powers, Europe.

Not receiving as much publicity, and carrying out a less glamorous but vital task, is the R.C.A.F.'s Maritime Air Command. With its headquarters at Halifax, this Command is responsible for naval co-operation duties, including submarine detection, reconnaissance and convoy patrols.

While remaining under normal R.C.A.F. peace-time control, Maritime Air Command forms a sub-component of the N.A.T.O. Atlantic headquarters at Norfolk, Virginia, and as such takes part in numerous N.A.T.O. exercises involving naval and air forces over the Atlantic. In the past year Maritime Air Command's squadrons have ranged from Key West, Florida, to the islands of the Far Arctic, and to the U.K., carrying out operations and training exercises.

Transport Command carries out another important task of the R.C.A.F. Its headquarters are at Lachine, outside Montreal, and its aircraft roam the world. Its squadrons operate the big long-range North Stars, Dakotas, C-119's, light Beechcraft Expeditors, and other types of transport planes.

One of its squadrons, the famed 426, has been flying steadily on the Korea airlift since 27th July, 1950. Carrying vital warloads for the U.N. forces in Korea between McChord Air Force Base near Tacoma, Washington, and Japan, it has flown more than 11,000 armed forces personnel, many of them wounded; and thousands of tons of equipment and mail.

A.T.C.'s squadrons carry out many other types of transport operations, including scheduled supply flights to Goose Bay, in the Labrador; Whitehorse, in the Yukon, and Resolute, on Cornwallis Island, hundreds of miles within the Arctic Circle. They also maintain scheduled flights across Canada, and to the U.K., in support of the overseas N.A.T.O. forces.

An important task handled by A.T.C. is the photo survey programme. This programme involves aerial photography of Canada for mapping and many other purposes, operating over isolated parts of Canada, and flying into the Far Arctic.

Military and civil maps are produced from the aerial photos, and the pictures are used in many other ways. In many cases they serve as the basis for geological maps, opening new mining areas. They are used in forest inventories, in irrigation projects, and hydro-development schemes.

Tactical Air Command has its headquarters at Edmonton, and its task includes offensive and transport support operations and training. It controls four Auxiliary light bomber squadrons, which would be available for tactical air support to Army forces, and would be able to call upon additional R.C.A.F. resources, including Air Transport Command's C-119 transports, designed for airborne operations and for general transport duties.

Tactical Air Command works closely with the Canadian Army, and would have the responsibility of providing air support in the event of land operations against an aggressor having obtained a lodgment. Because of its location it is also responsible for various other tasks, including search and rescue and various types of specialized training in the region.

General training is handled by the R.C.A.F.'s Training Command, whose headquarters are at Trenton, Ontario. Over-all training policies are decided by Air Force Headquarters, and are passed to Training Command for implementation.

Following the war's end aircrew training was centred at Centralia, Ontario (basic pilot training); Clinton, Ontario (radio officer training), and Summerside, P.E.I (navigation training). The R.C.A.F. expansion, with aircrew training aid to other N.A.T.O. nations, resulted in opening of numerous other flying schools. These additional schools, most of them providing basic and advanced pilot instruction, have been opened on the Prairies, at Second World War training stations that have been reactivated. Basic and advanced pilot training schools have been opened at Gimli, Manitoba; Claresholm, Alberta; Saskatoon, Saskatchewan; Moose Jaw, Saskatchewan; Penhold, Alberta, and Portage la Prairie, Manitoba. An additional Air Navigation School has been opened at Winnipeg, and is to absorb a similar navigation school which has been operating at Summerside. An Air Weapons School, providing armament training for fighter crews, has been opened at Macdonald, Manitoba.

Other specialist flying training for pilots is given at Trenton, where the Flying Instructor's School and the Central Flying School operate, and at Centralia, where in addition to a basic pilot training school, is operated the Instrument Flying School.

Separated from the flying training as handled by Training Command are the Operational Training Units. There are four of these, operated by Air Defence Command (at Chatham, New Brunswick, and North Bay, Ontario), Maritime Air Command (at Greenwood, Nova Scotia) and Air Transport Command (at Trenton, Ontario).

These O.T.Us. provide conversion to the actual type of aircraft that the pilot or aircrew will fly on reaching an operational squadron, as well as tactical and operational training.

The embryo flyer entering the R.C.A.F. goes first to the R.C.A.F. station at London, Ontario, where he passes through the Aircrew Classification Centre. There he is selected as a potential pilot, navigator or radio officer, according to preference, aptitude and medical classification. Ranking as a flight cadet and drawing officer rates of pay, he then is sent to the appropriate training school to work towards his wings.

Navigators receive their training and earn their wings at the Air Navigation School at Winnipeg, and radio officers learn their complex job at Clinton, where they receive their wings. From there they go to an O.T.U., where they continue their training before being posted to a squadron.

A pilot goes from London to a Flying Training School, where he learns to fly on a Harvard piston-driven single-engine trainer. From there he goes to an Advanced Flying School. There are two types of these, one for fighter pilots and another for pilots destined for other types of operations. The fighter pilot carries on to Pilot Weapons School, and then to an O.T.U. The pilot destined for another type of duty, transport operations, for instance, leaves the Advanced Flying School for an appropriate O.T.U., followed by squadron duty.

The Advanced Flying Schools training fighter pilots fly Harvards, which are being replaced by T-33 Silver Star jets. The other type of A.F.S. flies twin-engine Mitchells. Silver Stars are also to be used at the Pilot Weapons School, attended by the fighter pilots.

Not yet completed, but to play an important part in advanced training, as well as in guided missile development, is the big weapons range being built at Cold Lake, Alberta. This big range, measuring some 40 by 150 miles, is expected to begin operations this year (1954). It is necessitated by the increased range of aircraft missiles already in use and expected to come into use, and the high speed of today's fighters.

In addition to its own greatly increased aircrew training programme, the R.C.A.F. has been training aircrew for other N.A.T.O. nations. In 1950 Canada extended an offer to N.A.T.O. to train aircrew from abroad at the rate of 1,400 a year. The first group of overseas students, a small party of French aircrew trainees, arrived in Canada in the early autumn of 1950, and the first wings parades were held in May and June, 1951. Since then more than 2,000 N.A.T.O. aircrew have received training with the R.C.A.F. Training is given to aircrew from the U.K., Norway, Denmark, the Netherlands, Belgium, France, Italy, Portugal and Turkey.

The N.A.T.O. nations sending aircrew here for training pay transportation costs to and from Canada, and continue pay and allowances to the trainees. Canada absorbs the cost of actual training and provides accommodation, meals, etc., for the trainees, as an additional N.A.T.O. contribution.

Apart from the actual technical training, R.C.A.F. officials feel that a valuable purpose is served by the intermingling of the various nationalities during their period of training here. For most of the trainees involved, their training here is their first chance to live and work over an extended period with members of the military forces of other allied N.A.T.O. nations.

Ground crew training in the R.C.A.F. is more diversified. Recruits report first to the Manning Depot at St. Johns, P.Q., and are sent from there to the various training centres according to their trade. Technical trades, such as those of aero-engine mechanic and the airframe mechanic, are taught at technical training schools at Camp Borden and Aylmer, Ontario, and clerical trades receive their training at Aylmer. Armament instruction is given at Camp Borden.

Staff training for officers is provided at the R.C.A.F. Staff College in Toronto. Advanced training is given to senior officers at the tri-Service National Defence College, Kingston, Ontario, which is attended by officers of all three Services, and by selected senior civil servants and representatives from industry.

The R.C.A.F. also has a close interest in training provided by the three

Canadian Services College. These are Royal Roads, near Victoria, B.C.; Royal Military College, Kingston; and College Militaire Royal de St. Jean, at St. Johns, P.Q. These three schools are operated on a tri-Service basis, training young men as officers for the Armed Forces. Other R.C.A.F. officers are taken from the ranks, and from high school and college graduates.

Unique in the R.C.A.F. training programme is the Survival Training School, which operates in northern Alberta and at Cambridge Bay, N.W.T., within the Arctic Circle. Service aircrews are instructed in methods of bush and Arctic survival, training being given by experienced R.C.A.F. men, with Eskimos and Indians assisting. Ultimate aim of the school is to train all aircrew actively engaged in northern flying in survival techniques. Establishment of the school is indicative of the importance placed by the Service on "know-how" when it comes to the question of an aircraft's crew downed in the north.

Recently begun is a programme of ground defence training within the Service. The R.C.A.F. has been given responsibility for local ground defence of its bases, and active defence training is proceeding at bases both in Canada and overseas. It is felt that utilization of Air Force personnel in this manner not only broadens their outlook on military matters, but would free Army units in time of emergency for more active and offensive roles.

Possibly the least glamorous but certainly not the least important of R.C.A.F. Commands is Air Materiel Command, with headquarters in Ottawa. This command looks after logistical support of the Air Force, and an interesting article by its Air Officer Commanding was published in the July, 1953, number of this Journal.

Recruiting of women for the Regular Force began in July, 1951, and since then the women of the R.C.A.F. have won themselves the respect of all members of the Service, through their enthusiasm and efficiency. Present strength of women in the Air Force is close to 3,500, and they have shown themselves capable of performing many highly technical trades. The women fit into the general Air Force pattern, drawing the same pay as do the men, and commissions are held by many women. There is no separate women's corps or group, as existed during the Second World War, when women were recruited for wartime service.

The Regular R.C.A.F. is backed up by a steadily growing Reserve, which includes both squadrons engaged on flying operations and ground training units. Special stress, as regards the ground units, is placed on radar and other highly technical trades. Behind this is the realization that such skills, vital to the Air Force, cannot be gained overnight, and that available qualified personnel, having received their training in industry, would be limited in numbers in event of emergency.

Training for members of a Reserve unit is on a part-time basis, and members are able to attend summer camp for two-week periods in addition to normal training throughout the year. Reserve units take part in many schemes and exercises with other such units, or with Regular Force formations.

The R.C.A.F. "Chipmunk Scheme" provides refresher flying training to veteran R.C.A.F. pilots. They are being given refresher flying and ground training, to maintain a pool of potential flying instructors and staff pilots, ready to serve in emergency with a minimum of delay. Chipmunk training aircraft are supplied to flying clubs across Canada by the R.C.A.F., and actual instruction is given by the flying clubs, costs being met by the Air Force.

The R.C.A.F. is associated with Canadian universities through an under-graduate reserve training programme. Selected undergraduates are given three consecutive summer flying or ground training courses with the R.C.A.F., and on successful completion of this programme, and graduation from university, may be offered a commission in the Regular or Reserve Air Force. Those taking flying training receive their wings at the end of their third summer training period. Seventeen Air Force Flights, comparable to the Army's C.O.T.C. units, have been formed at eleven major universities, and Air Force training on a part-time basis is given throughout the school year to members of these flights.

Also under way is a scheme allowing high school students to take summer training with the R.C.A.F. This scheme has been extremely successful, allowing many youngsters to have a first-hand look at the R.C.A.F. before actually making up their mind whether to start on an air force career.

Highly publicized is the R.C.A.F.'s Search and Rescue organization, which is constantly in the news through its life-saving operations. Born of the war-time Air/Sea Rescue units, the present organization was set up as a permanent agency to carry out Canada's international commitments, which state that the Dominion will maintain an organization capable of rendering aid to aircraft in distress.

In addition to this, however, Search and Rescue has been called upon to carry out mercy missions of many types. There is no directive calling upon the R.C.A.F. to operate a free ambulance service, but where the job is a life or death matter, and where it can be handled by no one else, including commercial aircraft carriers, Search and Rescue stands ready twenty-four hours a day to seek out and lend assistance to those in distress in the wilderness. Some of these "unofficial" mercy missions have, in fact, resulted in the most spectacular operations carried out by Search and Rescue, including flights into the Far Arctic.

Control of Search and Rescue is handled by five major co-ordination centres at Halifax, N.S.; Trenton, Ontario; Winnipeg, Edmonton and Vancouver. Aircraft earmarked for search operations or mercy flights are stationed at Torbay, Newfoundland; Greenwood, N.S.; Goose Bay, Labrador; Trenton, Winnipeg, Churchill, Man.; Edmonton, Whitehorse, Y.T.; and Vancouver.

A colourful part of the Search and Rescue organization is the para-rescue corps. Specially trained para-rescue men and women, ready to drop by parachute to lend aid, are stationed at various points across the country and in the north. Volunteer para-rescue men, trained in bush lore, mountain climbing, first aid and parachute dropping techniques, have been joined by medical officers, medical orderlies and nursing sisters. The nursing sisters, to whom the Press has given the nickname "Para Pets," took to the arduous training enthusiastically, and have already made operational jumps into mountains and wilderness areas.

The close operational association of the R.C.A.F. and the U.S.A.F. Air Defence Commands has been mentioned. A close general association exists with both the U.S.A.F. and the R.A.F. on a broader basis. R.C.A.F. officers attend selected courses in the United States and the United Kingdom, and officers from those two forces take training with the R.C.A.F. In addition, the R.C.A.F. has an exchange programme with the U.S.A.F. and the R.A.F. Limited numbers of R.C.A.F. officers spend periods of time with the U.S.A.F. or the R.A.F., performing the task of an officer of that Service. Officers from those Services similarly fill in on R.C.A.F. jobs. The idea is to allow the three Services to become as well acquainted as possible in the interests of future co-operation in event of war.

Special arrangements were made with the U.S.A.F., to allow a limited number of R.C.A.F. fighter pilots to serve in Korea with operational U.S.A.F. F-86 Sabre fighter squadrons. A total of twenty-one such R.C.A.F. pilots saw service over Korea, and gave a good account of themselves. They were credited with a total of nine kills, eight destroyed and one damaged against the enemy MiG-15's. One of these R.C.A.F. pilots was listed as missing in action against the enemy.

Close association exists between the R.C.A.F. and the Air Cadet League of Canada. The League operates squadrons across the country, with an approved enrolment of 22,500. The squadrons are administered by the Air Cadet League, a civilian organization, but are equipped by the R.C.A.F. They provide training in citizenship and aviation subjects to air-minded youths.

Although not a component of the Air Force, the R.C.A.F. Association, formed in 1948, is closely connected with the Service. Having among its aims the "support in Canada of an adequate and efficient Air Force for the defence of our country," the Association has expanded across the country during the last several years, forming local wings in many centres. Membership is made up of Air Force veterans.

Today's R.C.A.F., larger than ever before in peace time and still steadily growing, is a proud Service with proud traditions. The R.C.A.F. did not exist in the First World War, but 22,000 young Canadians flew against the enemy with the Royal Naval Flying Service, the Royal Flying Corps and the Royal Air Force. They formed the traditions of the R.C.A.F. when it was created in 1924.

Since then the R.C.A.F.'s members, the men and women who fly and support the aircraft bearing the maple leaf roundel, have added to these traditions, in peace and war. Its present members are showing that the high standards set before are being maintained. They are showing themselves highly skilled and efficient, deserving the best available aircraft and equipment. It is the policy of the Department of National Defence to provide them with this. Much has been done and much is being done, and the R.C.A.F. now ranks as a fighting force of sufficient size and with the necessary equipment to command respect from ally or potential enemy.

ROYAL AUSTRALIAN AIR FORCE

NEW CHIEF OF THE AIR STAFF

[R.A.A.F. Official Photo

Air Vice-Marshal J. P. J. McCauley, C.B., C.B.E., B.Sc., R.A.A.F.

AIR VICE-MARSHAL J. P. J. McCAULEY, C.B., C.B.E., B.Sc., has been appointed Chief of the Air Staff, Royal Australian Air Force, and will take over from Air Marshal Sir Donald Hardman, K.C.B., O.B.E., D.F.C., R.A.F., on 15th January, 1954. Sir Donald Hardman completes two years on loan to the Australian Government and will then return to England.

Air Vice-Marshal McCauley has had a distinguished career in the R.A.A.F., both in peace and war. He was born in Sydney in 1899 and educated at St. Joseph's College, Hunters Hill. He first chose the Army as a profession and entered the Royal Military College, Duntroon, in 1916, graduating as a Lieutenant in the Australian Staff Corps in 1919. He was an Army officer until January, 1924, when he transferred to the R.A.A.F. as a Flying Officer. He completed the Staff College Course at Andover, England, in 1933.

As Director of Training from 1936-38 he left a great impression on the R.A.A.F. during its first period of expansion. He commanded No. 1 Engineering School upon its formation in early 1940, and that school's success in producing thousands of technical tradesmen during the following five years of war was in a large measure due to the knowledge, initiative and organizational powers which he displayed in its formative period.

[R.A.A.F. Official Photo

Wing Commander H. Edwards, V.C., D.S.O., O.B.E., D.F.C., R.A.F., spent a leave in Australia recently and visited his old home, the R.A.A.F. College at Point Cook, Victoria. He talked to the cadets, as shown, the officer with him being Group Captain N. Ford, O.B.E., R.A.A.F., who was with him at the College as a cadet before the war.

When the Japanese landed in Malaya, Group Captain McCauley was senior R.A.A.F. officer in the theatre. As Commanding Officer, R.A.A.F. Station Far East, he led the four R.A.A.F. squadrons in operations against the Japanese in Malaya and the East Indies. His aircraft constantly hammered Japanese naval vessels, troopships and landing barges to delay the invasion of Sumatra.

As the citation for the C.B.E. in 1943 put it: "Throughout the trying and difficult conditions which prevailed during the period of his service in the Far East, Air Commodore McCauley displayed courage, ability and qualities of leadership which won for him the admiration and respect of those who served with him and under him."

Returning to Australia, he was appointed Deputy Chief of the Air Staff in June, 1942, and held that appointment until October, 1944—during the R.A.A.F.'s most critical period. He went to Europe to serve as Air Commodore Operations at the Headquarters of the 2nd Tactical Air Force in France.

In 1946-47 he was again Deputy Chief of the Air Staff. In 1947 he went to Japan for two years as Chief of Staff, British Commonwealth Occupation Forces. Since 1949 he has been Air Officer Commanding, Eastern Area. He was awarded the C.B. in the Birthday Honours, 1951.

Air Vice-Marshal McCauley is one of the most widely travelled officers in the Australian Services, and has had an unusually wide experience in operations. He is also well known in the R.A.F., and is one of the few R.A.A.F. General Duties officers with a University Degree. He is a Bachelor of Commerce of the University of Melbourne.

Air Vice-Marshal McCauley will be promoted Air Marshal when he takes over as C.A.S.

ROYAL AUSTRALIAN AIR FORCE APPOINTMENTS

Air Vice-Marshal A. L. Walters, C.B.E., A.F.C., as Air Officer Commanding Eastern Area.

Air Vice-Marshal V. E. Hancock, C.B.E., D.F.C., as Air Member for Personnel.

Air Vice-Marshal W. L. Hely, C.B.E., A.F.C., as Deputy Chief of the Air Staff.

Air Vice-Marshal A. M. Charlesworth, C.B.E., A.F.C., as Air Officer Commanding, R.A.A.F. Overseas Headquarters, London.

Air Vice-Marshal A. M. Murdoch, C.B.E., as Air Officer Commanding, Southern Area.

Air Commodore M. O. Watson, O.B.E., as Air Officer Commanding, Western Area.

Air Commodore P. G. Heffernan, O.B.E., A.F.C., as Air Officer Commanding, North Eastern Area, relieving Air Commodore I. D. McLachlan, D.F.C., who proceeds to England as R.A.A.F. student for the 1954 course at the Imperial College of Defence.

Air Commodore W. H. Garing, C.B.E., D.F.C., D.S.C. (U.S.), as Air Officer Commanding, R.A.A.F. Richmond, N.S.W.

Air Commodore E. G. Knox-Knight, C.B.E., as Air Officer Commanding, R.A.A.F. Point Cook and Commandant of the R.A.A.F. College.

Group Captain R. H. Davis, O.B.E., A.D.C., to replace Air Commodore E. G. Knox-Knight at the School of Land/Air Warfare, Williamstown, N.S.W.

Group Captain N. Ford, O.B.E., A.F.C., as Director of Training.

AIR MARSHAL SIR DONALD HARDMAN, K.C.B., O.B.E., D.F.C., R.A.F., RETURNS TO ENGLAND

[R.A.A.F. Official Photo

Air Marshal Sir Donald Hardman, K.C.B., O.B.E., D.F.C., R.A.F., with Trainee Naval Pilot S. R. Carmichael during a visit to Point Cook F.T.S.

Early in 1952 the United Kingdom Government placed at the disposal of the Australian Government the services of Air Marshal Sir Donald Hardman, K.C.B., O.B.E., D.F.C., who was then Commandant of the Royal Air Force Staff College, for appointment as Chief of the Air Staff of the Royal Australian Air Force, with the acting rank of Air Marshal.

Air Marshal Sir Donald Hardman, on the termination of his two-year appointment, will be returning to England early in 1954 and in the terms of the Australian Press he has "done a big job of work." The measure of his achievement in the eyes of Australians can be gauged by leading articles in such papers as the *Sydney Morning Herald,* which are unstinting in their wholehearted praise for what he has achieved in so short a space of time.

Those who have worked in close co-operation with him on his staff are equally generous in their respect for him as a fine administrator and their regret at his departure.

During his tour as Chief of the Air Staff he has undoubtedly raised the prestige of that high appointment, accomplished big scale reorganization, such as replacing the area structure by a Command organization and successfully integrated the uniformed and civilian elements of the staff into a co-ordinated and smoothly working team.

Even more important, he has accomplished that most difficult of all tasks, to put across and obtain recognition of "Air Power" as the first line of defence and in consequence the most important factor in the Nation's defence.

It is clear from Australian Press reports that, at the time of the announcement of the appointment of a Royal Air Force officer to this post, there were many who were sceptical as to the wisdom of this decision.

Air Marshal Sir Donald Hardman's personality, tactful handling of difficult situations and efficiency in the job for the past two years, have done much to enhance the prestige of senior officers of the Royal Air Force. He has amply proved that they possess the quality which will withstand the severest test in high appointments, however difficult and arduous the task handed to them may be. When the moment comes to say "farewell," the Royal Australian Air Force will wish him well at that leave-taking and be grateful to him for the very fine job he has done for them and for Australia.

GOVERNORS ACCEPT R.A.A.F. APPOINTMENTS

The Governor of South Australia, His Excellency Air Vice-Marshal Sir Robert George, K.B.E., C.B., M.C., has been appointed Honorary Air Commodore of No. 24 (City of Adelaide) Squadron, Citizen Air Force. The former Honorary Air Commodore of this squadron, the previous Governor of South Australia (His Excellency Lieutenant-General Sir Willoughby Norrie, K.C.M.G., C.B., D.S.O., M.C.) is now Governor-General of New Zealand. Lieutenant-General Norrie has relinquished the appointment to No. 24 Squadron but has now accepted appointment as Honorary Air Commodore in the R.A.A.F.

"The R.A.A.F. is honoured by the association of such a distinguished R.A.F. officer as Sir Robert George with the Citizen Air Force," the Minister for Air (Mr. William McMahon) said when announcing this appointment.

"The appointment of the Governor-General of New Zealand as an Honorary Air Commodore in the R.A.A.F. also gives us great pleasure because of his associations with the South Australian Squadron of the Citizen Air Force."

ROYAL NEW ZEALAND AIR FORCE

By Flight Lieutenant G. Bentley, R.N.Z.A.F.

NEW CHIEF OF AIR STAFF APPOINTED

Air Vice-Marshal Walter Hugh Merton, C.B., O.B.E., R.A.F., at present Air Officer Commanding No. 22 Group, Technical Training Command, R.A.F., is to succeed Air Vice-Marshal D. V. Carnegie, C.B., C.B.E., A.F.C., R.A.F., as Chief of the Air Staff, R.N.Z.A.F. in February next.

Air Vice-Marshal Carnegie, who was appointed Chief of Air Staff in January, 1951, will return to the United Kingdom towards the end of February.

Air Vice-Marshal Merton, who is forty-eight, has had a distinguished career in the Royal Air Force. He was educated at Eastbourne College and the R.A.F. College at Cranwell, where he trained as a pilot. He was commissioned on the completion of his pilot-training in 1925.

After service in India from 1931 to 1936 and in the Middle East from 1940 to 1943, Air Vice-Marshal Merton was appointed Assistant Commandant of the R.A.F. War Staff College in 1943. In 1944 he was appointed Director of Organization at the Air Ministry, a post he held for two years. Appointments as station commander in Bomber Command from 1946 to 1947, as Air Attaché at Prague from 1947 to 1948, and as head of the R.A.F. Delegation and Air Officer Commanding R.A.F. in Greece from 1949 to 1950 followed, before Air Vice-Marshal Merton took up a post as Air Officer Commanding of No. 63 (Western and Welsh) Group, Home Command.

Air Vice-Marshal Merton, who was promoted to his present rank in January of this year, has been awarded the C.B. and O.B.E. He has also been mentioned three times in despatches and is a holder of the Gold Cross of the Royal Order of George I with Swords (Greece).

AIRCRAFT RE-EQUIPMENT PROGRAMME ALMOST COMPLETED

"With the exception of the four Territorial fighter squadrons, the re-equipment of the Royal New Zealand Air Force has been virtually completed," said the Chief of the Air Staff (Air Vice-Marshal D. V. Carnegie, C.B., C.B.E., A.F.C., R.A.F.), in a message prior to relinquishing office.

Reviewing the aircraft re-equipment programme, which was instituted some time prior to his appointment as Chief of the Air Staff on loan from the Royal Air Force, the Air Vice-Marshal said that squadrons generally were in a healthy state, operating in the main with modern aircraft but with a strength generally short of establishment.

Air Vice-Marshal Carnegie pointed out that the long-serving Dakota aircraft of No. 41 (Transport) Squadron had been replaced by Hastings and Bristol freighter aircraft, that the Regular fighter squadrons, Nos. 14 and 75, had gone over from propeller-driven aircraft to Vampire jet aircraft, that new De Havilland Devon aircraft had been bought for signals and navigation training, and that

Sunderland flying-boats, which had been rebuilt and refitted in the United Kingdom, were now replacing Catalina flying-boats, which had been used by the R.N.Z.A.F. since early in the Second World War.

The Territorial squadrons would eventually be provided with jet aircraft. In the meantime these squadrons had been equipped with Mustang fighters which, though they had been in long-term storage since the end of the war, were nevertheless new in so far as they had been flown for the first time when delivered to the Territorial squadrons nearly two years ago.

LONDON—NEW ZEALAND AIR RACE: SIDELIGHTS

"Everest Film"

First person to step out of the turbo-prop Vickers Viscount on its arrival at Harewood was Mr. P. G. Masefield, chief executive for B.E.A., and team manager of the Viscount crew. In his hand he held New Zealand's copy of the Everest Conquest film.

The sight of the film container labelled "Everest Film" drew cheers from the crowd.

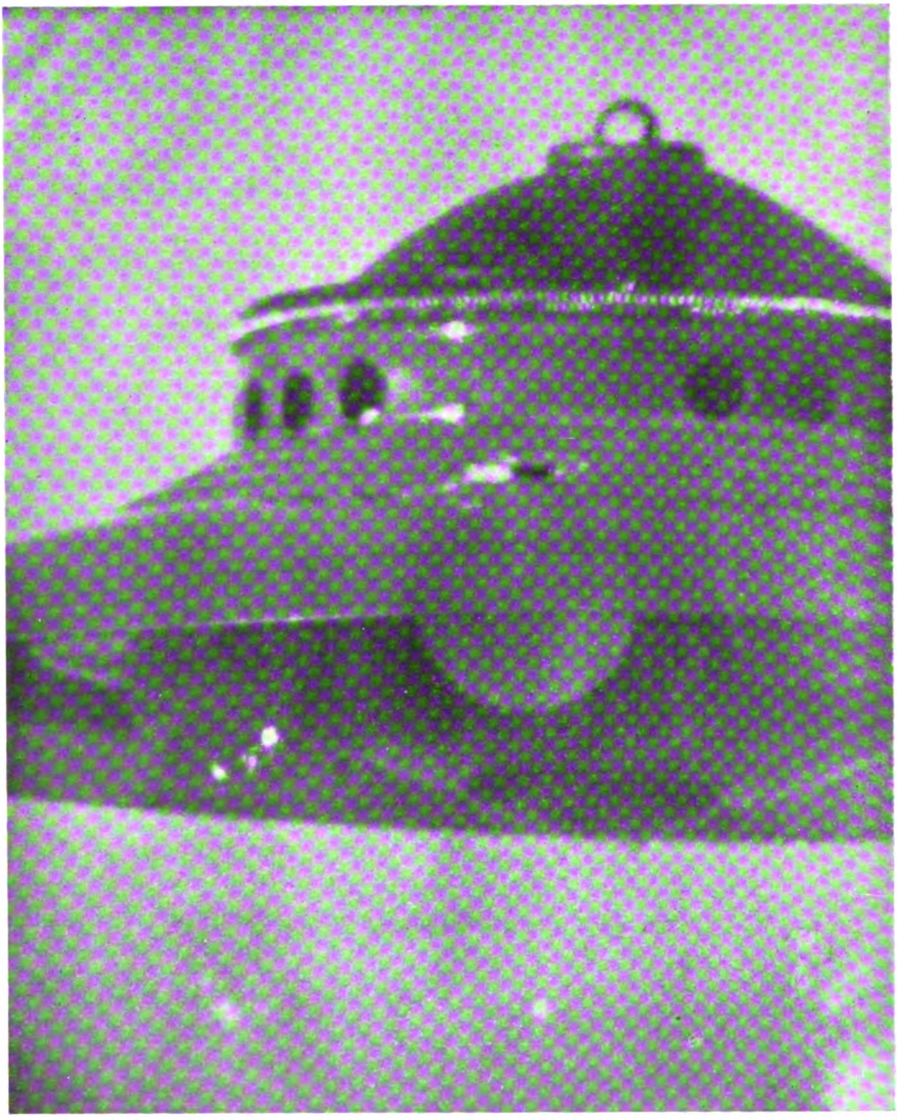
Later, the Viscount's acting chief steward, Mr. J. D. Profumo, who is actually Parliamentary Secretary to the British Minister of Civil Aviation, explained that New Zealand's national hero, Sir Edmund Hillary—himself an R.N.Z.A.F. navigator in the Second World War—had carried the film to London Airport from Northolt with Mr. Masefield in a helicopter.

"WHAT DO YOU THINK, SIR?"

Wing Commander R. M. McKay, A.F.C., Director of Operations in the R.N.Z.A.F., ponders a situation posed by Flight Lieutenant R. L. E. Burton, A.F.C., winner of the London—Christchurch Air Race, when the two met in the Officers' Mess, Wigram, after the race.

Strictly Business

"Strictly business" could well have been the motto for the K.L.M. Douglas aircraft which won the transport section of the International Air Race. Besides thirty-eight passengers, who paid about £300 each for their passage, there was an impressive cargo list. For Christchurch, envelopes, nylon hose and watches; for Auckland, silks and textiles; for Wellington, watch parts and jewellery.



[*Photo from "Flying Saucers Have Landed"*

"FLYING SAUCER"

Venusian flying saucer, or "Scout ship," photographed at 9.10 a.m., 13th December, 1952, at Palomar Gardens, California, by George Adamski through his six-inch telescope. About 35 feet in diameter, this little space craft was made of a translucent metal. Notice the portholes, spherical landing gear and the lens or light on top of the cabin. The white line round the base of the dome appeared to be some form of power coil.

BOOK REVIEWS

Flying Saucers Have Landed. By Desmond Leslie and George Adamski. (Werner Laurie, London. 230 pp. and Bibliography; 13 illustrations; 30th September, 1953; 12s. 6d. net.)

This book deals with the greatest and most exciting mystery of our age. The title, dogmatic and challenging, invites critical scrutiny of the claim it makes that "flying saucers" have actually landed on our earth.

The frontispiece, alleged to be an actual photograph taken in December, 1952, of a "flying saucer," shows a large bell-like object with portholes and hitherto unknown type of spherical landing gear, with a caption which arouses an immediate desire to learn if this is an authentic photograph.

In the first chapter the authors contradict the conclusions by unenlightened sceptics, who suggest that eyewitnesses who have reported these strange objects have only seen 'ionized air," "meteorological balloons," "secret weapons of the U.S.S.R. or U.S.A.," or merely "illusions." They strongly support the testimony of credible witnesses who claim to have seen "flying saucers" from another planet and proceed to produce exhaustive and lengthy proofs of this conclusion.

Because of the mass of evidence collected from British and American pilots, ships' captains and others whose evidence could be depended upon, who have submitted clear detailed reports of what they have seen and because these reports corroborate earlier evidence, this book is not in the category of those which ask, "Do you believe in fairies?" because in this case no one has ever seen one.

That it has been possible to obtain and publish several photographs, both of the large cigar-like "space ships" and the smaller bell-like "flying saucers" (35 ft. in diameter), may seem incredible. Yet there they are in this amazing book.

By quoting from ancient writings, observatory reports and legends handed down through the ages, the authors draw the conclusion that the visitations of weird types of aircraft from other planets to this world of ours, is nothing new. The searching of ancient history to establish this adds considerable interest.

The description of what might well be termed "unearthly happenings" between 1947 and 1953, certainly arouses a desire to learn more, as, even if unwillingly, one is drawn towards the conviction that "flying saucers" may have made landings. The description of the actual meeting between one of these Venusian pilots and Mr. George Adamski must in our matter-of-fact world ready very much like a fairy story, but to support it there are several sworn affidavits of eyewitnesses whose names and addresses are given, to this extraordinary, hardly credible occurrence. (In this particular incident the book enters the realms of Jules Verne or H. G. Wells.)

The conclusions of the authors, as to why in recent years the inhabitants of other planets should once again take sufficient interest in our world, to renew aerial visits of observation, is more easily acceptable.

Desmond Leslie says: "There is a very old tradition in the arcane schools of Egypt, Greece, South America and in some of the Western arcane orders that a planet in our system was once destroyed by the misapplied discovery of the fundamental power of the atom. Modern astronomy has calculated that, according to their rules of celestial mechanics, there should be another planet about the size of our own—between the orbits of Mars and Jupiter. Instead of a planet, however, there is a ring of cosmic dust, stones and debris called the Asteroid Belt. If such a planet did exist and was suddenly destroyed, the repercussions on the rest of the solar system must have been catastrophic. . . . This would certainly explain the tremendous interest shown in our earth displayed by the 'flying saucers' since the discovery of atomic energy, for the solar system happens to be their home as well as our own."

This book is written for those who like to walk along the untrodden paths and who believe all things are *possible*, particularly those things held by other men to be impossible. The authors are certainly zealots in this respect. In their relentless search for the solution of the mystery of "flying saucers," they have left no stone unturned and search a second time under stones rejected by others. In so doing they have found strange and unearthly things, the description of which cannot but help hold the interest of the readers and leave them, even if unconvinced, in a state of amazed wonder to find themselves believing that hitherto unbelievable things might be possible. They may even find themselves surreptitiously studying the heavens for some signs of "flying saucers." Such is the interest created by this amazing book.

A. H. S.

ERIC, THE VERY GENTLE KNIGHT

NOW this very gentle Knight, Eric, prepared to defend his realms against the barbarian invaders.

"What is the strength of my forces?" he asked.

"Four thousand and fifty gallant men and true," said his Chief Statistician.

"Arm them mightily to withstand every blow that the enemy may deliver . . ."

"But, sire, in all the land we have only two dozen skilled armourers. All our forges and furnaces are already at work . . ."

"Then do your best. Fashion the helmets of solid brass, make the suits of armour so strong that neither lance nor arrow will wound. Arm their steeds too with the finest and heaviest chain mail. I am a man of peace."

"But, sire, the task is far beyond our resources."

"Those who defend my realms," said the Knight Eric, "must be the most heavily accoutred in all Europe."

The Chief Statistician sighed, slowly shook his head and withdrew.

A month later the barbarians attacked and seventy-three knights rode forth to do battle, their fine armour gleaming in the sun, their plumes flying.

Eric, watching from the battlements of his castle, saw them, counted them and turned incredulously to the Chief Statistician.

"How many knights have we?" he asked.

"Seventy-three armed as you have directed, sire, and three thousand nine hundred and seventy-seven without weapons and therefore *hors de combat.*"

Eric turned pale. He saw his seventy-three knights surrounded by thousands of barbarians. He saw them fall from their mounts and lie gasping like landed fish.

"Why, oh why," groaned Eric, "do they not get to their feet and fight like men?"

"Alas, sire," said the Chief Statistician, "their armour is too much for them."

As one by one the knights were slain Eric buried his face in his hands and wept.

"To think," he said, "that we might have put four thousand men and horses into the field!"

"Four thousand and fifty, sire," said the Chief Statistician.

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FOLLAND

Space Travel—An Illustrated Survey of its Problems and Prospects. By Kenneth W. Gatland and Anthony M. Kunesch. (Allen Wingate Ltd., 12 Beauchamp Place, London, S.W.3. 205 pp.; 15s.)

It is a mere fifty years since Orville Wright lifted his frail stick-and-string biplane into the air to open the age of flight; yet here we have two young men calmly discussing plans to fly to the moon and beyond. Make no mistake, these interplanetary enthusiasts are no dreamers. They include scientists like Werner von Braun, designer of Hitler's V2 war rocket, famous doctors and astronomers. Their proposed space-ships, already designed in minute detail, have no parallel in the history of powered flight. There is no easy way to the stars with wax and feather wings or wire and canvas fuselages. The simplest kind of piloted interplanetary rocket must combine the most advanced products of a dozen sciences and will cost anything up to £1,000,000,000. Before it can ever set out on the first flight to the moon, another £1,500,000,000 and ten years' work may have to be poured into construction of a huge artificial moon, circling for ever 1,000 miles above the earth—a space station from which ships of fantastic shape will depart for outer space. Interplanetary flight at such a price would probably remain a paper project but for one all-important factor. Aviation started as a sport and took many years to develop along the two lines of "death and dividends." Space-rockets are potential weapons of tremendous power right from the start. As a result, the road to space is already being paved by supersonic research aeroplanes, pilotless bombers, anti-aircraft missiles, atomic bombs and high-altitude research rockets, all paid for out of war funds.

America has more money to spend on such things than we have, and our security is more stringent than theirs. So the reader need hardly be surprised that *Space Travel* implies that our practical achievements lag behind those of the United States or even war-time Germany. American scientists have even begun to plan construction of the first space-station, which would be as useful for launching atomic missiles as space-ships.

But experience in aviation has shown that the man who sits down to think about the position of a needle in a haystack may find it just as quickly as the man who builds a million dollar haystack-tearing-down-machine to do the job. We must never underestimate the ability of our own young scientists, many of whom have responsible jobs in the aircraft industry.

Nor, as in other matters, should we under-estimate the Soviet. It is enlightening to discover that a Russian named Nikolai Kibaltchitch designed a rocket plane in 1881, and that his fellow-countryman Konstantin Zialkowsky was first to suggest seriously that a rocket could operate in space. There is very much more of great interest in this book. If it gives the impression that we have not yet progressed far beyond the war-time achievements of Hitler's scientists, except in theory, it is well to remember that we knew very little about jet-engines and nothing about atomic bombs until they were operational facts. It is just as unlikely that we shall know more about space-ships and space-stations than is contained in this book until they have crossed the first frontiers of space. We can only hope that the world they leave behind will not first have been devastated by rockets of a more lethal type.

J. W. R. T.

Return Ticket. By Anthony Deane-Drummond. (Collins, 14 St. James's Place, London, S.W.1. 256 pp.; 12s. 6d.)

If the film companies ever want a successor to *The Wooden Horse*, which must have made them a lot of money, or the too-frequent technicolored "musicals" (which probably make even more money), they could do far worse than choose this story. Even when told in the prosaic style of the man who lived through its adventures, it is full of suspense and excitement—so full, in fact, that even Hollywood script-writers and Mr. Erroll Flynn could hardly do better!

Basically, *Return Ticket* is the story of four years in the life of a young British Regular Army officer named Anthony Deane-Drummond. It covers his training as one of Britain's first paratroops and his participation in the first amateurish paratroop operation in Italy in 1941, in which we blew up an aqueduct, at the cost of all the men who took part in the operation. Deane-Drummond was made prisoner by the Italians, who matched well the British war-time caricature of Mussolini's pathetic *ersatz* Roman legions. He was taken to the "escape-proof" prisoner-of-war camp at Sulmona, where he was horrified to discover that "the number of officers who really wanted to escape was very small indeed." A minority even said quite openly that they did not want to escape, they saw no point in it and if ever a tunnel was built and if they were ordered to get out through it, they would start building another one, through which to get back inside the camp again. It is

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significant that the first men to escape from Sulmona were a Royal Navy submarine officer, a R.A.F. flight lieutenant and a paratroop officer (Deane-Drummond himself)—men from those branches of all three Services which call for the greatest courage and discipline. There could be no better example of the ultimate superiority of a relatively small *élite* force, compared with a large conglomeration of conscript humanity.

Deane-Drummond had to escape twice before reaching the safety of Switzerland and there is much to be learned from his mistakes as well as his successes. He returned to England, was dropped with the immortal First Airborne Division at Arnhem and captured again. But men who have experienced life behind barbed wire do not give in easily and he escaped once more, after spending 13 days and nights hidden in a wall-cupboard in a German guard-room. The rest of the story, describing how ordinary Dutch men and women risked their lives to restore him to freedom should delete for ever from our language the derogatory expression "Dutch courage."

J. W. R. T.

The Flying Sailor. By Rear-Admiral André Jubelin. (Hurst and Blackett Ltd., Hutchinson House, Stratford Place, London, W.1. 276 pp.; illustrated; 16s.)

This story, too, begins with an escape. But Captain Jubelin, as he then was, fled from his own countrymen, and in style—if one can call flying over 600 miles of shark-infested ocean in a worn-out single-engined light plane "stylish."

The date was 4th November, 1940. France had capitulated, and Jubelin found himself in dock at Saigon, gunnery officer of a French flagship with no war to fight. So he took a refresher course at the local flying club and, at an opportune moment, escaped to Malaya in one of the club machines, which had to be refuelled perilously in flight over the sea.

Imagine the chagrin of such a man when he found himself posted on arrival in Britain to command a dirty, poorly-disciplined old depot ship, anchored in a quiet lagoon near Portsmouth. Suffice it to say that within a few weeks he had changed this ship into such a potent fragment of the air defences of the city that it became a target for continuous attack by the *Luftwaffe*.

But that is nothing compared with the surprises that follow. Miraculous escapes from death by bombing apparently persuaded Jubelin that the safest place was in the air, for we next find him fighting from the cramped cockpit of a R.A.F. Spitfire, after a short spell on Walruses, during which he achieved notoriety by looping the loop in one of these ancient amphibians. It could hardly have been thoughts of safety, however, that persuaded a 34-year-old senior naval officer to join a command whose pilots had a life expectancy of four and a half months.

Later still, Jubelin managed to transfer to No. 1 Hurricane Squadron—the famous night "intruders" and it is in this part of the book that we find moving tributes to that greatest of all night-fighter pilots, the one-armed Squadron-Leader J. A. F. MacLachlan, D.S.O., D.F.C. and bar. Here too are wonderfully inspiring stories of night operations, of bringing home to safety crippled or lost aircraft, and of some that did not get home. It is a story of which any British reader can be proud, for we "see ourselves as others see us"—through the eyes of a sincere friend who is not afraid to criticize the aloofness that makes a foreigner not quite a gentleman.

Rear-Admiral Jubelin is now the youngest Admiral in the French navy, the French naval attaché in Washington and French delegate to the Supreme Allied Command Atlantic. *Flying Sailor* proves that if he ever feels like retiring, he could make a good living as a writer, for his work has that enchanting, precise beauty of style that previously seemed to have died with Antoine de Saint-Exupéry.

J. W. R. T.

The Naked Island. By Russell Braddon. (T. Werner Laurie Ltd.; 15s.)

This books tells the story of the fight for Singapore, its fall, and the fate of some of its garrison in the years that followed. There have been other books on the same subject but *The Naked Island* has several unusual features.

Firstly, though this is his first novel, the author shows undoubted literary talent, including considerable descriptive powers. Many writers can convey vivid pictures, but most do it by laying their colours on thick, piling adjective on adjective and superlative on superlative to impress the reader by almost swamping his reactions. Russell Braddon gives a striking and realistic account of his own and others' experiences by the opposite process. His speciality is a cold, unemotional, unadorned style of description which by its very understatement contrives to convince. For example his feelings towards the Japanese

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. . ."Anti-submarine weapons, both shipborne and airborne, far more effective than anything known during the last war, are becoming available, and arrangements have been made to enable heavier and faster types of naval aircraft to be handled in, and operated from, our fleet carriers."

Extract from the Statement by the First Lord of the Admiralty explanatory of the NAVY ESTIMATES, 1953/4.

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are more forcefully expressed in half-tones and implications than by the explosive and dramatic vituperation of some other authors. Nevertheless, he is not wholly proof against emotion, and one of his defects is that when he develops an antipathy against an individual or class he allows it to prejudice all his judgments thereon.

Secondly, the author was unfortunate enough to run the whole gamut of experience of this period. He saw the Singapore of prosperity and over-confidence, the onset of aggression, the actual fighting from start to finish, and every variety and horror of imprisonment. The sufferings of those in Changi and on the Siamese railway have been recounted before and, though strikingly related, their story may be too familiar to many to maintain its original impact. Less well known is the full story of the preliminary fighting in Malaya. Many people now remember only the final debacle and have forgotten, if they ever knew, the intensity of the struggle that preceded it. This was not so much a fight against odds as against circumstances, against an enemy whose direction, planning, intelligence, training and equipment were all superior to our own. In the air this was equally true. We started with inadequate resources and obsolete equipment and the reinforcements that would have been invaluable a few months earlier arrived as always, "too little and too late."

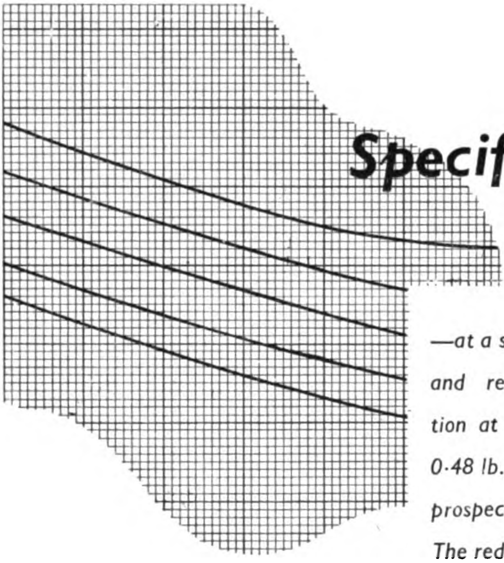
Nevertheless from one aspect, on the ground and in the air, we were not outclassed, that is in courage and fighting spirit. The author's story is personal and therefore gives only a limited view of the fighting, but it is enough to indicate a degree of determination and endurance under appalling conditions that deserved a better fate, and a better chance than it was given. It deserved also perhaps better of the historians, and this book, by showing that the high qualities which made us proud of the prisoners of Changi and Siam were demonstrated also before their imprisonment, gives a more balanced and equitable picture of the whole story of Malaya in 1941-42 than has been previously available.

C. N. F.-N.

The Strange Case of Alger Hiss. By The Earl Jowitt. (Hodder and Stoughton; 20s.)
Witness. By Whittaker Chambers. (Andre Deutsch; 21s.)

The name of Alger Hiss and the celebrated case associated with his name are perhaps so well known as to require no further introduction to readers on this side of the Atlantic. Four years ago, almost to the day, Hiss, a highly placed official in the State Department, was sent to prison for perjury. The charge against him arose out of evidence given by Whittaker Chambers, a writer on *Time* magazine, before the House Committee on Un-American Activities. That evidence alleged that Hiss was a Communist sympathizer and that he had worked actively against the State. It was later alleged that Hiss had handed over secret documents to Whittaker Chambers, at the time a Communist agent. Since the jury reached its verdict on the perjury charge on 21st January, 1950, however, discussion of every aspect of the case has continued almost unabated. Was Hiss guilty? Many, including so eminent an authority on the law as Lord Jowitt, would argue that, on the evidence, he was not. Yet there are many who are convinced that he was, whatever deficiencies there may seem to have been in the way the case was presented and conducted in the American courts. And behind the simple question of Hiss's guilt lurks a more fundamental problem. If Hiss was guilty, what safeguards has western democracy against apparently so insidious an organization as the Soviet secret service?

It would not be possible in the space of a brief review to answer the second question, although it will present itself again and again as one reads through the two important books named above. *Witness*, which caused a sensation in America when it appeared there some time ago, is a frank reply to the anti-Chambers whispering campaign that started not long after Chambers had testified before the House Committee. It is not a restrained book, nor can it be described as a particularly well written book notwithstanding the writer's wide experience as a journalist, but it is a powerful and compelling book that, despite its great length, engages attention to the last page. Its most impressive feature—its transparent sincerity apart—is undoubtedly the atmosphere it creates, an atmosphere that at one moment reminds one of Aeschylean tragedy, at another of Koestler, and at yet another of Dostoevsky. Nowhere is this atmosphere better created than in the description of the other-world methods of the Russian *apparat* in America. Chambers faces the moral problem raised by espionage squarely. Why should highly educated men, he asks, find it possible to betray their country? As he explains, conscience is not involved. It is involved only at the point a man decides to accept the programme and discipline of the Party. Indeed to ask the question at all shows that "whoever asks it has still failed to grasp that Communists mean exactly what they have been saying for a hundred years; they regard any government that is not Communist, including their own, merely as the political machine of class whose power they have organized expressly to overthrow, including



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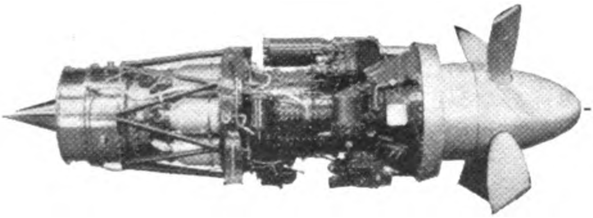

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violence." Stalin, in his *Problems of Leninism,* could not have put the matter more clearly.

After *Witness* the reader will doubtless find *The Strange Case of Alger Hiss* rather dull and prosaic. It is hastily written and unashamedly partisan. Lord Jowitt is plainly not convinced that Hiss was guilty in a purely legal sense and argues that no English court would have convicted him. But Hiss was not tried before an English court, and these considerations are irrelevant except in so far as English rules of evidence may conceivably throw light on the value of some of the evidence placed before the American court. At times Lord Jowitt is less than fair in his summaries of what passed in both the House Committee and the court (pp. 22, 27, 36, 43, 50, etc.), and the reader would be well advised to read instead the verbatim extracts from the evidence which form so prominent a feature of Whittaker Chambers's book. More regrettable, in the opinion of the present reviewer, is the almost total failure of *The Strange Case* to take the Communist conspiracy seriously. Had its nature been more clearly appreciated, it is possible that *The Strange Case* might have taken a very different form.

J. F. F. L.

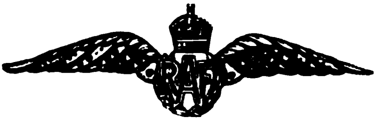
LIST OF NEW BOOKS

Tumult in the Clouds. By Andrew Cunningham. (Peter Davies, London, 29.9.1953. 204 pp. 10s. 6d. net.) The author trained as a navigator in the Royal Air Force and completed two tours of operations in night-fighters. He was awarded the D.F.C., leaving the Service as a Squadron Leader in 1946. He shapes in the form of fiction an exciting account of night-fighting and intruder operations over England and the Mediterranean. He portrays the friendships and team-spirit that existed among aircrews of Beaufighters and Mosquitoes. The point of view is primarily that of the navigator—the "back-seat driver." It ends with the story of a remarkable bombing sortie which is as intensely dramatic as much of the book which precedes it.

Modern British Aeroplanes. By Charles Gardner. 2nd Edition. (Temple Press, London, 21.9.1953. 91 pp. Fully illustrated. 9s. 6d. net.) For many years Charles Gardner, formerly Air Correspondent of the B.B.C., has been in close touch with all developments in British Aviation. In this book, which covers the exciting progress made during the past five years, he explains in language easily understood by the average boy the whys and wherefores of the many new shapes now seen in the British skies. For all interested in aviation, whether "Young Boys" or "Old Boys" this is an instructive book, the instruction being in terms which can easily be understood and bring all air-minded readers knowledge of aircraft, engines, radar and theory on matters connected with flight up to date.

"The Aeroplane" Directory, 1953 Edition. Compiled by the staff of "The Aeroplane." (Temple Press, London, 10.4.1953. 540 pp. 15s. net.) A Classified Directory of British and Commonwealth Service and Civil Aviation. In the section "Who's Who in British Aviation" it contains brief details concerning 1,550 personalities in British aviation. A summarized version of "The Air Force List" gives details of the Air Ministry, commands, etc., of the R.A.F. as well as those of the Commonwealth Air Forces. The same summary is given of the Army and Navy. Civil aviation organizations are included in greater detail, as well as a handy section for use by the aviation industry.

"The Eagle Book of Aircraft." By John W. R. Taylor. (Hulton Press, London, 19.10.1953. 192 pp. 8 coloured plates and hundreds of photographs and drawings. 10s. 6d. net.) The author, a regular contributor to this Journal, is well known to our readers, and this new book is full of interest to the "air minded" and will also increase their numbers. It covers a very wide field of aviation from "How it all started," through the years of changing design, right up to today, and the building of a "real flying saucer." Profusely illustrated—on the principle of the old Chinese proverb that "a picture is worth a thousand words"—this book is a veritable mine of information. The publisher's skill in presenting this book in large easily-read type, together with the first-class "lay-out" both of pictures and the story of aircraft, add greatly to the pleasure of reading. This *Eagle Book of Aircraft* provides that long-needed easy reference book on aviation.



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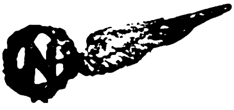

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Airborne at Kitty Hawk. By Michael Harrison. (Cassell, London, 19.11.1953. 118 pp. 30 illustrations. 8s. 6d. net.) A survey of man's attempts to fly. This book deals with great thoroughness with the many attempts through the ages by man to conquer the mystery of flying, from imitating the flight of birds, the lighter-than-air experiments, to those of heavier-than-air aircraft, culminating with the first real conquest by Wilbur and Orville Wright.

Feathered Wings. By Anthony Jack. (Methuen, London, 29.10.1953. 131 pp. 16 half-tone plates, 45 line illustrations. 15s. net.) *Feathered Wings* at first lays down the most simple aerodynamic principles and from there goes on to classify and name various styles of bird flight, manœuvres and aerobatics. Other chapters discuss the theory of dynamic soaring and the full observation of albatrosses in flight. Other sections cover the effect of wind on level flight, the larger aspects of navigation, meteorology and the anatomy of birds as flying creatures. Thus, whilst this book is chiefly for bird lovers, it should interest flying men also.

A History of Flying. By C. H. Gibbs-Smith. (Batsford, London, 29.10.1953. 304 pp. 161 illustrations. 21s. net.) This is another survey of man's attempts to fly; from Icarus to the threshold of the interplanetary rocket, it carries the reader far beyond the first conquest of the air by man-made heavier-than-air aircraft and spans the complete history of flying. The *History of Flying* is less an impersonal account of the progress, understanding and application of theory than the very human story of the aeronautical pioneers themselves. The History is illustrated by some 161 diagrams, drawings, prints and photographs. Aptly, and often amusingly, they picture the fantasies, the failures, and finally the successes which mark the milestones in the history of flying.

Brassey's Annual, 1953. Edited by Rear-Admiral H. G. Thursfield. (Clowes, London, 21.10.1953. 491 pp. 24 illustrations. 63s. net.) This is a most comprehensive and thorough survey of the armed forces in 1953. The General Section covers The Officer and His Hire, The Services in 1952-53, Commonwealth Strategy, The Fighting Services from Parliament, The New Warfare of the 1950's, The Context of American Rearmament, Factors in Soviet Policy, Civil Defence, Operational Research, The Middle East and Sea Power and the Aircraft Carrier. The Navy, Army and Air Force sections which follow are equally comprehensive in surveying matters of the moment which are of import to all three fighting Services. A very valuable book of study for all interested in the defence of this country and a useful reference book on all matters concerning the armed forces.

Into Space. By P. E. Cleator. (Allen & Unwin, London, 24.9.1953. 142 pp. and analecta. 22 illustrations and 6 cartoons. 15s. net.) The author is the founder of the British Interplanetary Society, honorary member of the American Rocket Society and the Pacific Rocket Society.

BOOKS OTHER THAN AVIATION

Russia After Stalin. By Isaac Deutscher. (Hamish Hamilton, 1953. 174 pp. 10s. 6d. net.)

South-East Asia in the Coming World. By P. W. Thayer (Editor). (John Hopkins. O.U.P. 1953. 306 pp. $4.75.)

The United States and India and Pakistan. By W. Norman Brown. (Harvard University Press, 1953. 308 pp. $4.50.)

Survey of International Affairs, 1949-50. By P. Calvocoressi. (Oxford University Press, 1953. 590 pp. 52s. 6d.)

Modern German History, with a Select Bibliography. By Ralph Flenley (University of Toronto). (Dent, London, 1953. 406 pp. 30s. net.)

The Communist Conspiracy. By Stephen King-Hall. (Constable, London, 1953. 239 pp. 15s. net.)

Pistols, Rifles and Machine Guns. By Major W. G. B. Allen. *s.a.c.* (The English Universities Press, London, 9.11.53. 178 pp. 72 illustrations and diagrams. 15s. net.) This book consists of a straightforward explanation of the principles that govern the mechanisms of small arms. The scope of the book has been extended to include descriptions of American, Belgium, French, Hungarian, Italian and Russian weapons.

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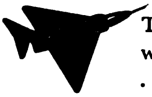

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"ROYAL AIR FORCE QUARTERLY," VOL. V.

JANUARY, APRIL AND JULY, 1953

In addition to the regular series in this Journal, which included Editorial, Air Affairs in Parliament, Current Events affecting air power throughout the world, Sporting Activities in our air forces, Promotions and Appointments in the air forces, Film and Book Reviews and Lists of New Books, as well as occasional articles in light vein, the undermentioned feature articles were published in this Journal during 1953:

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(Incorporating "The Royal Air Force Quarterly")

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PIONEER OF THE AIR

THE LIFE AND TIMES OF COLONEL S. F. CODY

BY G. A. BROOMFIELD

With a Foreword by
Sir Geoffrey de Havilland, C.B.E., F.R.Ae.S.

SAMUEL FRANKLIN CODY is a good subject for a biography. Born at Birdville, Texas, U.S.A., in 1861, of Ulster stock, he became a buffalo hunter and a superb horseman. At length he came to Europe and, after a chequered interlude as a showman and writer of melodramas (in which he also acted), started his career in aeronautics—first with kites, and then aeroplanes. The crowning moment of his life—his triumph in the Military Trials Competition against some of the best opposition the world could produce—came after many bitter disappointments which would have broken a lesser man. Always colourful, he somehow gripped the popular imagination, and held it until that day in August, 1913, when Sir Geoffrey de Havilland "heard his aeroplane flying, and then suddenly all was quiet." "I never looked upon Cody as a trained engineer," says Sir Geoffrey, "but he was a wonderful improviser with tremendous faith in his own ideas, and, after all, his aeroplanes did fly, and that at a time when many machines that might be claimed to be more 'scientific' did not fly."

The author was a lad when he met Cody, and formed an association with the airman which was to last until Cody's death. He gives an intimate picture of a picturesque character based on an unrivalled knowledge of Cody's background, problems and achievements. To illustrate his book he has drawn on many sources, and the photographs he reproduces form an adequate complement to his text.

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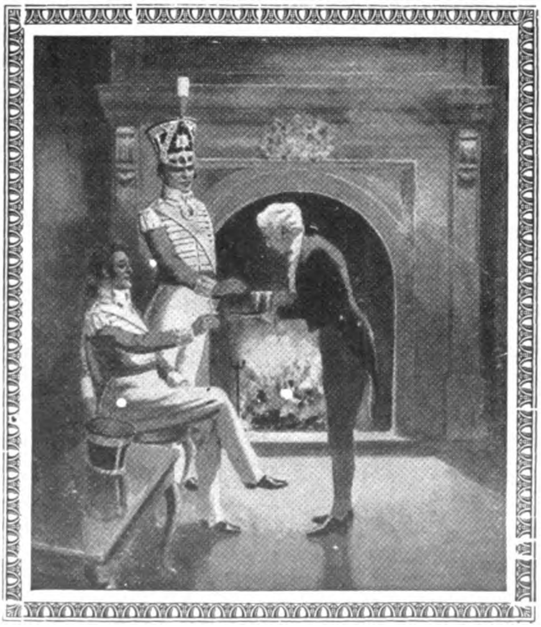

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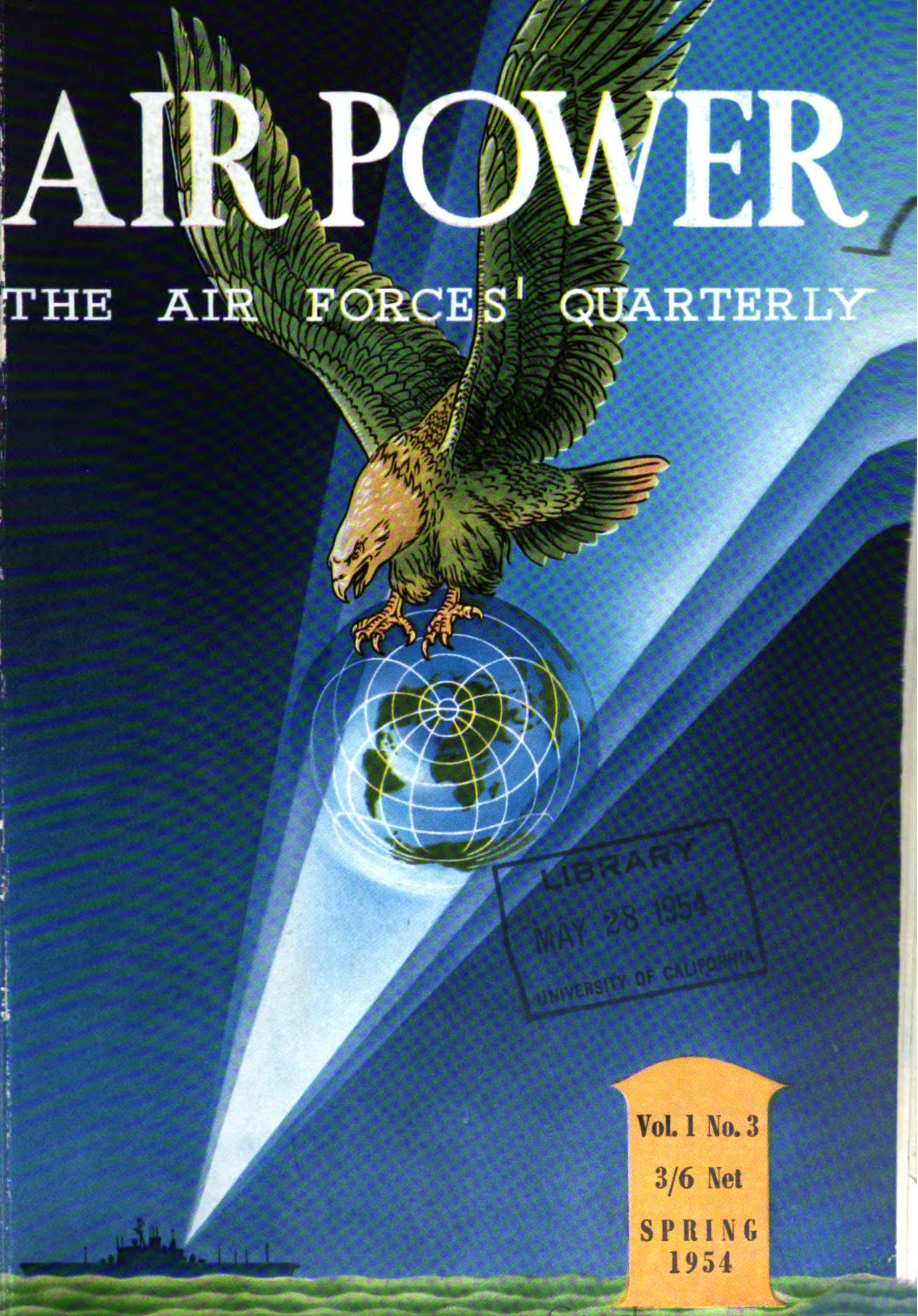

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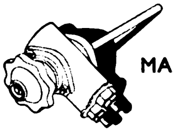

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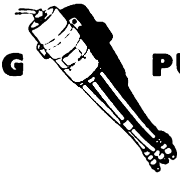

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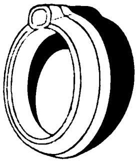

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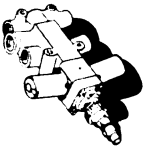

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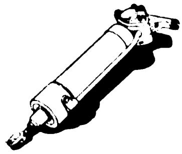

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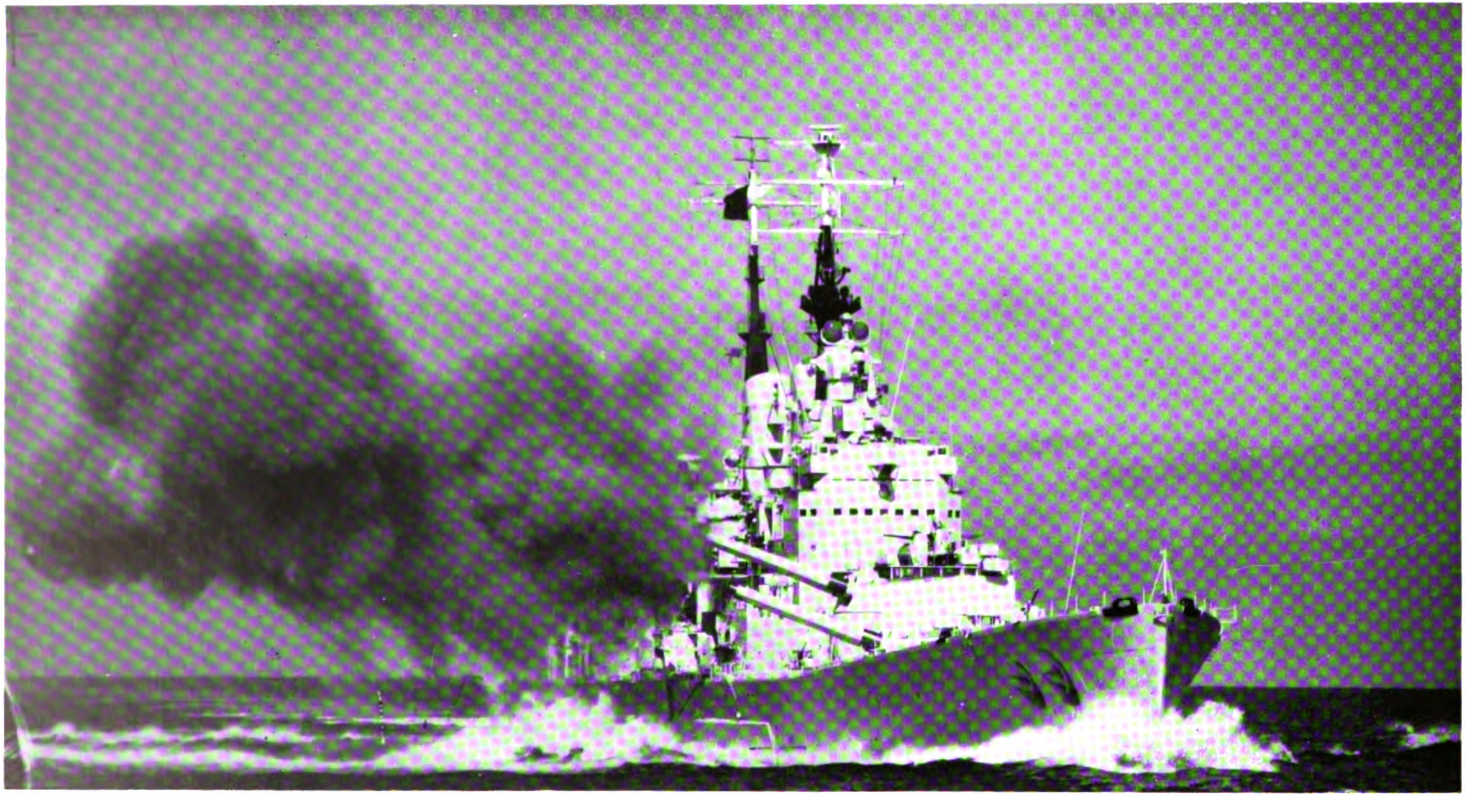

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THE BATTLESHIP (H.M.S. "VANGUARD")

The largest query concerning the Navy of the future. (See p. 265 The Navy of the Future)

EDITORIAL

THE DEFENCE OF OUR SEA COMMUNICATIONS

THE Navy Estimates published on 24th February, with its expansion of the minesweeper and anti-submarine forces and completion of aircraft carriers, gives some indication of the new trend of Naval construction to meet the new threats likely to challenge in the future our "Freedom of the Seas."

The defence of our sea communications in any future war presents a *new problem.* To rely upon the same methods which gave us the maximum protection over ten years ago (in the Second World War) would be disastrous. It would be a repetition of the lack of vision exemplified in the South African War when, with complete disregard of the changed conditions, our soldiers were sent out to fight in scarlet tunics against invisible marksmen. What a target! And what a cost in human life and suffering!

The problem of the protection of convoys crossing the vast oceans, under the increased perils which will face them in any future war, now calls for revised and modernized defence measures, new weapons, different types of ships and closer collaboration and co-operation between air power and sea power. Many controversial views have been expressed in this Journal on this subject, and occasionally partisanship has biased the proposals made. Some suggestions on the method of co-operation being moulded to suit the Service of the authors, and the main objective, i.e., the best way of employing the Air Force and the Navy for the defence of this country, seemed to have become a secondary consideration. We hope that the day is now dawning when unity of purpose will replace petty Service jealousies.

The increased range, speed, ceiling and striking power of aircraft, air-to-surface homing missiles, atomic and hydrogen bombs, new type submarines, surface-to-surface homing missiles of increasing accuracy and possibly hitherto unheard of secret weapons, have all added to the previous perils of the sea. The threat against worth-while targets, such as battleships or large aircraft carriers, from atomic bombs is very real. "The gloomy truth is that anyone who possesses a large stockpile of atomic bombs will in all likelihood possess also the means of getting at least some of them—and probably a good percentage—through to the target."*

These changes are great, far greater than those between the First and Second World Wars, and it is vital that the fullest consideration is given to them in evolving the best plans for the defence of our sea communications under these *new conditions.*

One factor that has not changed is the need to protect large convoys of ships, the safe conduct of which across the seas is vital to our ability to maintain any future war for more than a brief period. They will present a large and vulnerable target. Their danger from attack by surface vessels can be assessed to some extent by an appraisal of what is known of the Russian fleet. "Taking only the comparatively modern vessels into consideration, we can put the Russian operational strength at something like 20 cruisers, 100 destroyers and 350 (100 new type) submarines."† The *Sverlov*-class cruisers are, indeed, formidable potential raiders, displacing some 12,800 tons with a main armament of twelve 6.1 inch guns, and a reported maximum speed of 35 knots. The danger from underwater attack has increased from the great improvement in the performance of the modern submarines, but greatest of all is the increased threat from air attack for the reasons given earlier. Large convoys were easier to get through in the Second World War, but whether under new conditions this still holds good is debatable but (at the risk of being challenged by some critics) it still seems essential to have close escort for convoys large or small in mid-ocean if adequate protection is to be given against all these increased dangers.

---

* "Report on the Atom," by Gordon Dean, p. 110.

† Brassey's Annual, 1953, p. 147.

Under these new conditions there appears to be no necessity for the retention of battleships. Even the American suggestion to retain them as launching platforms for guided missiles seems misguided, and equally debatable is the wisdom of retaining the large aircraft carriers. Both are large and vulnerable targets and the cost of maintaining them crippling to any nation's financial resources. When it is realized that the *Eagle* cost something like £16,000,000, and the number of valuable aircraft she has aboard is also considered, there is necessarily a strong argument against "carrying all the eggs in one basket" and much in favour of dispensing with these large floating aerodromes, which might be lost in one attack. They could with advantage be replaced by an increased number of the "light fleet" type. This seems even more important with the rapid development of the homing air-to-ship missiles.

Another controversial matter is the question of who is to be responsible for the "air cover" for convoys. Whilst the present arrangement continues, whereby the control of the nation's air power is divided between the Royal Air Force and the Royal Navy, neither one of them alone can give adequate cover in all circumstances to convoys, and the closest collaboration and co-operation of both Services will be essential. It would prove a difficult matter for the Royal Air Force, if the weather clamped down on the aerodromes of their land-based aircraft, and the presence, in such circumstances, of close escort carriers in mid-ocean ready for immediate action is clearly necessary.

It is not known whether increased defence armaments against these new threats are being installed in merchant shipping of suitable types, but it would certainly strengthen the defence of convoys in time of war.

When considering these interesting problems of co-operation between the Navy and the Air Force for the protection of our lifelines across the seas, vital as is the protection of our convoys, we must not lose sight of the fact that it is overshadowed by an even greater need in any future war, i.e., the winning of the first air battle at the very outset—for command of the air.

With such devastating bombs now in existence, such as the hydrogen bomb, "capable of creating an explosion of a new order of magnitude, dwarfing the mushroom clouds of Hiroshima and Nagasaki,"‡ should the Royal Air Force lose for even a brief period the command of the air, these other problems will no longer concern us. It is not even safe to rely upon an atomic attack of *short* duration. No national effort can be too great to ensure that the Royal Air Force is capable of winning the first air battle, which would be a prelude to any future war.

The defence of our sea communications will depend primarily upon the initial struggle for command of the air over this country and over our life lines across the seas.

---

‡ "Report on the Atom," by Gordon Dean, p. 113.

WAR ON LOGISTICS

By J. M. Spaight, C.B., C.B.E., LL.D.

THE NATURE OF LOGISTICS

"STRATEGY, tactics and logistics make up the content of the art and science of war, and the third is not the least important of the three components. Once, when weapons were primitive and invaders lived on the land, it was of no great consequence. It has increased in importance as armies have become larger, as their equipment has grown more elaborate, as their stores and supplies have come to be used or expended on a scale unprecedented in the older wars, and as the moving of troops and their impedimenta has tended to make upon a belligerent country's transport system demands which may impose upon it a strain approaching breaking point. The ever-increasing mechanization of war has brought with it, inevitably, complexities of production and maintenance which only a very massively planned organization can cope with successfully. A major conflict takes place today on an economic as well as on a military front, and what is done on the former reacts directly upon the fortunes of war on the latter. To have amassed better armaments in greater abundance than your enemy, and to be able to keep up the supply of them, is to have gone half-way to victory already."

Logistics is defined in the *Shorter Oxford Dictionary* as "the art of moving and quartering troops, i.e., quartermaster-general's work." The definition is too restrictive today. Logistics run back much farther than the point at which "Q" work begins, and the movement that is in question is not, as the definition seems to imply, that of troops only. (In practice, the moving of troops in the field would be regarded as tactics, not logistics.) A distinction is sometimes made between "civil logistics" and "military logistics," the former being "the mobilization of the civilian industrial economy to support the armed forces," and the latter "the supplying of men and material and the rendering of services to the operating military forces."[1] It is very difficult, however, especially in total war, to draw a line between the civil and military efforts in this matter. It is better to take logistics as embracing everything that has to be done for armed forces in the way of providing them with all their material needs and ensuring that they are in this respect ready for battle. Its concern is the business of supply of armies, fleets and air forces, of the production, procurement and delivery to them of everything required to make them well-found fighting forces, of ensuring that they lack none of the multifarious kinds of stores and equipment which are used in war today on a prodigal scale. The logistician has to be a universal provider. He is in charge of the power-house and pipe-line of the nation's war potential. His work can spell victory or defeat; the military potential of a nation, it has been said, is directly proportional to its logistic potential. He has to go into business in a big way, to become large-scale buyer, manufacturer, wholesaler, store-holder, forwarding authority, allocator of scarce materials, apportioner of man-power for the industrial war effort, organizer and co-ordinator of a vast range of productive undertakings, controller of a host of economic activities. He has all sorts of rather unspectacular tasks to perform as well, the back-room jobs, the chores of war. He may lack the glamour that clings to the strategist and the tactician, he is not a fighting man but more probably a tycoon of the world of big business, but he no less than they is an authentic architect of victory.

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[1] Rear-Admiral H. E. Eccles, "Logistics—What Is It," in *United States Naval Institute Proceedings*, June, 1953, p. 646.

INTERFERENCE WITH ENEMY LOGISTICS

That a belligerent should interfere with his enemy's logistical effort is in the nature of things. It is all part of the game. War is, in fact, a glorified game of "Spoil Five," or rather of "Spoil Three." You try to spoil your enemy's strategical, his tactical and his logistical effort. To succeed in doing the last is not only important in itself but is a contribution to success in doing the first and second. It is not a new departure made possible by the coming of the air age. Belligerents have always tried to do it. On land there has been little opportunity for action of the kind, though sabotage by enemy agents has not been unknown, but at sea interference with the enemy's logistics has been a regular practice for generations. The right to resort to it has been fully recognized in the conventional rules applicable to belligerent conduct. It is the basis of the law of maritime contraband. The effect of the coming of air power has been merely to extend to an enemy's hinterland the sphere of operational interference which was previously possible only in blue water.

No less important is the development brought about by the variety of war labelled "total," involving as it does the enrolment for war work in some shape or form of a high proportion of the whole population of a belligerent country. The result has been that war on logistics has tended to become something not very far short of war on the whole civilian economy of the enemy. This tendency had made itself manifest at sea already, but it has been in the new domain of the air that it has been especially marked. When professional armies were alone engaged and the number of combatants was comparatively small, it was possible to conduct war on sea-borne commerce according to rules which, in effect, exempted from seizure as contraband cargoes which were of no value to the fighting forces. In the First World War this practice underwent a significant change. Because Germany, it could be held, had become a nation in arms, the British Government extended the definition of contraband to cover a wide range of commodities not previously so classified. The Germans, on their side, by their sink-at-sight submarine warfare, abandoned *de facto* the traditional usage, of which the exercise of visit-and-search was an essential feature, of differentiating between the cargoes which were of military utility and those which were not.

INTERFERENCE BY AIR ACTION

A comparable development in the conduct of the war against logistics took place in the air. It occurred in the Second World War, and the counterpart of the unheralded torpedo attack of the first war was the fire-bomb raid of the second. Each, in its way, marked a stage in the process of the abandonment of the assuagements of the rigours of war in favour of civilians which it had been the hope of the framers of international conventions to establish. The effect of the scattering of masses of incendiary bombs on a crowded centre was inevitably to increase greatly the area of devastation caused by a raid, as compared with that caused by high-explosive bombs. The purpose of such blanket attacks was to put out of action the industrial undertakings engaged in war work within the area, but spreading fires are not selective in their action and the main sufferers were people and property having little or no connection with the war effort. There was little military advantage to be gained from this kind of overspilling destruction.

There is not much prospect of belligerents foregoing their right to strike at an enemy's logistics in a future war. The probability is that they will do so more than ever. "The decisive battle of the World War III," it has been suggested, "will be fought against production and war-making potential rather than against men."[2] There is some hope, however, that the war on logistics will not be conducted in quite the same way in a future war as it was in the last one. It was a wasteful way, it involved an enormous military effort, much of which might have been saved with better selection of targets, and it was slow to yield results. The Anglo-American air offensive against Germany did not prevent production in that country from increasing up to July, 1944. The Germans' attempt to cripple our logistics was still more unrewarding. The big air offensive which they began in August, 1940, had the definite aim of creating a crisis of supply in this country. Hitler's Directive, No. 17 of 1st August, 1940, said: "After gaining temporary or local air superiority, air attack will be continued on harbours, paying special attention to food storage depots and particularly food storage depots in London."[3] At a staff conference on 8th/9th January, 1941, Hitler directed that "attacks on Britain must be concentrated on supplies and the armament industry . . . the supplies and ships bringing them must be destroyed. Continued assaults by the Luftwaffe and the Navy on imports might lead to victory as early as July or August."[4] This hope was disappointed. The Luftwaffe's bomb-aiming equipment was too crude, its personnel too inadequately trained in night operations to succeed in identifying and knocking out the targets that really mattered for this purpose. The German strategic offensive was, on the whole, a ham-fisted affair.

AMERICAN RAIDS ON JAPANESE TOWNS

But the fact is that none of the belligerents' air forces had as yet come to terms with the war on logistics.They were only feeling their way, learning as they went along, relying on trial and error to give them the requisite experience. The story of what happened in Japan is particularly instructive. There the United States Army Air Force mounted in the spring of 1945 a massive offensive designed to destroy Japan's whole industrial potential. It began with a great fire-bomb raid on Tokyo on the night of 9th March, 1945, when 15.8 square miles of the city were burnt out and nearly 84,000 people lost their lives. It was followed up by similar attacks on Japan's other large cities—Osaka, Kobe, Nagoya, Yokohama and Kawasami; Tokyo itself had six heavy raids in all, and by the end of them the area of devastation had been increased to 56.3 square miles, more than half of the entire city area. Then, the airmen turned their attention to the secondary cities, and some of these were more completely devastated than any of the six largest had been. In Toyama the burnt-out area came to the "fantastic figure of 99.5 per cent."[5] A great number had more than 60 per cent. of their built-up area destroyed.

INCENDIARY BOMBS

The raids referred to were fire-bomb raids. The incendiaries used were of several different kinds. In Germany the 4-lb. magnesium-thermite bomb had been the bomb most commonly used in the urban attacks, and it was used in Japan also, e.g., in the devastating raid on Kobe on 16th March, 1945. In Japan, however, the most largely used incendiary was the 6-lb. oil bomb, the M.69, which was highly effective against light construction. Napalm-filled bombs, M.47, were first dropped by the pathfinders to start fires which gave the main formations their aiming points. In Germany a 30-lb. oil bomb (benzole and white phosphorus) was used by the Royal Air Force, and the effect of it seems to have made a deep impression upon eyewitnesses of the big fire raids, notably those of the end of July, 1943, upon Hamburg and of mid-February, 1945, upon Dresden.

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[2] John E. Kieffer, *Strategy for Survival*, 1953, p. 101.

[3] Quoted by Milton Shulman, *Defeat in the West*, 1947, p. 48.

[4] Quoted by A. Martienssen, *Hitler and His Admirals*, 1948, p. 100.

[5] *The Army Air Forces in World War II*, Vol. V, 1953, p. 657.

The worst of all the incendiary agents dropped on Hamburg, said one who was there, was *der Phosphor.* "It flowed like water down the walls of the houses and could not be extinguished. Many of the people set on fire by the phosphorus bombs screamed in their mortal agony for help, but help there could be none. Whoever approached was enveloped in flames too."[6] In Dresden the rain of phosphorus bombs and oil bombs left thousands burnt to death in the streets, while thousands more lay crushed and buried in the ruins of the dwellings. "Bombs and phosphorus-canisters," says an eyewitness bitterly, "could not choose between factories, dwelling houses and hospitals. They exploded just where they happened to fall." The sea of flames (Flammenmeer) engulfed everything.[7]

THE WHOLESALE DESTRUCTION

Scenes as terrible must have been witnessed in many a town in Japan, where the flimsy construction made fire-bombing a particularly destructive kind of bombardment. Industrial Japan was scorched from end to end. Never in modern war have cities been destroyed in such a wholesale way; and it is beyond doubt that the aim of the great offensive was achieved. Japan's war potential was critically damaged. The bombing, coupled with the operations (naval and air) at sea, wounded her mortally, and did so by war on her logistics. The armament factories themselves were but a fraction of the building that went up in flames, but, as the American official history states, so many survivors of the raids had to be evacuated that it was difficult to find labour for the plants that were not wrecked.[8] But, and this is now generally recognized, the way in which the set task was done was a wasteful way and not invariably an effective one. At Hamburg, for instance, the city was almost torn to bits, yet it had recovered 80 per cent. of its industrial productivity in a few months. Clearly the attack on logistics, for all the sound and fury of it, had here no lasting effect. Attacks of this kind involved the destruction of the greater part of a town in order to destroy the factories therein. If the comparison is permissible in such a sombre connection, there was an echo in it of Charles Lamb's account of the Chinese discovery of roast pork. Unfortunately, it gave a handle, both in Germany and Japan, to those who criticize strategic bombing as being an undiscriminating and inhumane method of warfare. That charge can be only rebutted where it can be shown to be an unavoidable method, justified by the necessity of war. In some instances the critics would have some ground for replying that the same result could have been achieved if the attack had been concentrated on points other than those which were in fact attacked.

COMMUNICATIONS AS OBJECTIVES

What are those points? The answer, so far as Japan is concerned, is given in the authoritative report of the United States Strategic Bombing Survey. They were railways, tunnels and bridges. If these had been put out of action the tremendous assault on the towns would have been unnecessary. In all, the United States Air Forces dropped more than 160,000 tons of bombs on Japan's home islands. Attack on her communications would have "strangled" her more easily. "This strangulation would have more effectively and efficiently destroyed the economic structure of the country than individually destroying Japan's cities and factories. It would have reduced Japan to a series of isolated communities, incapable of any sustained industrial production, incapable of moving food from the agricultural areas to the cities, and incapable of rapid large-scale movements of troops and munitions."[9] And all this, the Survey adds, could have been achieved at a cost of 5,200 tons of high-explosive bombs dropped in 650 visual bombing sorties by B-29 bombers.

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[6] Werner Baumbach, *Zu Spät?* Buenos Aires, 1949, p. 271.

[7] Axel Rodenberger, *Der Tod von Dresden*, Dortmund, 1952, pp. 94, 99. The photographs at the end of this book of heaps of blackened corpses laid out or piled in the streets and open spaces are a ghastly reminder of what the fire-bombing of a large city means in practice.

[8] *The Army Air Forces in World War II*, Vol. V, p. 643.

The Survey's conclusion may be challenged by those who remember that the United Nations air forces were unable to disrupt completely the Communists' communications in North Korea. The conditions there, however, were very different from those which would be found in a country that was itself the seat and source of its system of supply and maintenance. The Communists in North Korea had their true logistical bases in China and, farther back, in Russia, and the Allies' aircraft were not at liberty to strike at those bases. The Communists' front line was sustained by a very primitive line of supply, which for that very reason was a difficult line to cut. The troops at the front were provided with food and munitions carried down to them by night on porters' backs; the large, triangular wooden frames upon which the supplies were hoisted, allowed enormous loads to be transported in this way by the abundant manpower that was available. An immensely more elaborate system, and one employing train and lorry transport, would be required in a major war in Europe.

ATTACKS ON RAILWAYS AND OIL PLANTS

There, the vast complex of production and transportation that would be necessary would afford objectives in plenty for an assault on a belligerent's logistics. Some of them would be such that a blow at both production and transportation could be struck in an attack on a single target. An example is a raid on railway workshops or locomotive repair sheds. Another is an attack on oil refineries and synthetic oil plants. Oil is the life-blood of mechanized forces. It was because the Allies grasped that truth, one of the shrewdest of the German war leaders has said, that they won in 1945. They saw that the essential need was to condemn the Germans to immobility and that the way to achieve this aim was to paralyse the nerve centre of Germany's whole strategy, the liquid fuel sources, and thus to hamstring the Luftwaffe, the Marine and the motorized formations of the Army.[10]

By January, 1945, "Allied air power had deprived the Wehrmacht of its strategic mobility. The German railways were now moving only one-third of the traffic which they had been handling six months earlier. The great *autobahn* which stretched unbroken across Germany from the Rhine to the Oder was strategically useless, since there was no petrol for the large-scale movements of troops by road."[11] The effect was especially disastrous for the German air force. In the last year of the war "bombers continued to be built until no more gasoline was available for their test flights and they had to be reduced to scrap on the very same airfields on which they had been built."[12] The repercussion upon Germany's problem of home defence against the Allies' bombers was no less serious. After the war Mr. Roderick Chisholm interviewed a German fighter ace, Major Schnauffer, who told him that petrol shortage had crippled the defence and that in the last phase the maximum fighter effort by night had been limited to about eighty sorties instead of the 200 possible earlier.[13] So it was that the Allies' air forces, by striking at the fuel oil element of German logistics, were able not only to bring about a substantial impairment of the mobility of the German land and sea forces, but also to leave the German air force without the means of striking back at the Allies' logistics. It was a doubly profitable strategy. It paid both dividend and bonus.

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[9] United States Strategic Bombing Survey, *Summary Report (Pacific War)*, 1946, p. 19.

[10] General Herhudt von Rohden in *Allgemeine Schweizerische Militär Zeitschrift*, French translation in *Forces Aériennes Françaises*, April, 1953, p. 89.

[11] Chester Wilmot, *The Struggle for Europe*, 1951, p. 624.

[12] Generalleutnant Adolf Galland, *Defeat of the Luftwaffe*, in *Air University Quarterly Review*, Spring, 1953, p. 35.

PSYCHOLOGICAL BOMBING

The urban raids it is true had, and will always have, a psychological effect which attacks on non-urban objectives might not have to the same extent. War factories are commonly situated in (often densely) populated centres, and attacks are calculated to have an adverse effect upon the enemy's will-to-war as well as upon his power to wage war. Indeed, the very fact that his cities are brought under enemy fire cannot but have a depressing influence on the nation's morale in general and affect his prestige. It was to produce such an effect that the Doolittle raid was made on Tokyo on 16th April, 1942. The Japanese had been boasting that *they* were about to carry the war to the United States and to dictate terms of surrender in the White House.[14] They had a shock when the American bombers appeared over Tokyo, but obviously it did not break their will-to-war, which remained unbroken for three years longer. It was then broken, or seemed to be broken, as the result of two spectacular raids made for their psychological value, but by that time Japan was already in a hopeless position, beaten by land, sea and air, and with almost all the fight gone out of her. Whether the effect would have been the same when her morale was in a more robust condition is open to question.

Still, there will always be a temptation in these days of super-weapons for belligerents to say: "We'll blast the will-to-war out of them once and for all. What will strategy, tactics and logistics matter then? The whole trouble will be settled by one blow." The blow is commonly taken to be one which will send the enemy's capital, with all that is in it, soaring sky-high. The trouble is that the enemy may be thinking along just the same lines. The game is one at which two can play, and which no one can win in the end. Belligerents are dwellers in glass houses. They are constrained, whether they like it or not, to keep the golden rule constantly in mind. Kant's Categorical Imperative has reasserted its force in these later days. It did not avail to save the belligerents' capital cities from being devastated in the last war. It might have saved them if France, ever solicitous for Paris, had remained under arms to the end. The French, so long as they were in the war, "opposed any course which could possibly provoke German action against French cities."[15] There were no strategic attacks on cities while France was a belligerent; the raids on Warsaw and Rotterdam were not strategical but tactical, that is, in support of ground operations. The same fear of retaliation may well save the cities in a future war. The weapons that are or will be available will be of such potency that neither side will be inclined to initiate attacks that would be assuredly replied to and would be disastrous in their effects. There are too many glass houses in Western Europe to make such a prospect one which belligerents not bereft of their senses would welcome.

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[13] R. Chisholm, *Cover of Darkness*, 1953, p. 205.

[14] Quentin Reynolds, *The Amazing Mr. Doolittle*, 1953, p. 169.

[15] Denis Richards, *The Fight at Odds*, H.M.S.O., 1953, p. 111.

LOGISTICS AS TARGET

If there is no attempt to snatch a quick victory by what would be, in effect, a political rather than a military decision, or if such an attempt is made but fails, there will be nothing for it but to try to win the war by the less spectacular process of upsetting the enemy's three "apple-carts," the strategical, the tactical and the logistical. The third of these "carts" will assuredly not be left alone, and as its contents are relied upon to replenish any losses from the other two, the upsetting of it will be a matter of serious consequence for the enemy. The effect may be to put the whole trio out of business. The owner may have to shut up shop and go home.

That may very well be the way in which a future great war will come to an end. Both belligerents may find that they have not the wherewithal to continue it, so enormous will be the expenditure of materials of all kinds, so disastrous the losses before those materials ever reach the fighting line, and the result may be that the war will just fizzle out. The home front, the economic front, may be unable to stand the strain; logistics and not strategy and tactics may be found to be the point at which the break will come. It will come all the sooner if the nation's nerves of motion are impaired. A great military historian has said: "War is first and foremost a matter of movement."[16] He was thinking, no doubt, in terms of strategy and tactics, but his words are true of logistics also.

GETTING AND SPENDING

"Getting and spending," Wordsworth wrote in the *Sonnets*, "we lay waste our powers." War, no less than life itself, is getting and spending. The getting is the work of the logistician, the spending of the strategist and the tactician. The getting is of two kinds. First, all that is needed for the war has to be made or procured. Then it is necessary to get the products to the place where they are to be expended. Experience in the last war, alike in the west and in the east, goes to show that it is in this second stage of the logistical process that that process can be interfered with most effectively. Interference may not always be practicable during the first stage; armaments may be manufactured, processed and assembled underground. When that has been done, however, they must emerge at some time into the light of day, so that they can be transported to the spot where they are to be used. It is then that air power can find its opportunity. It can strike at movement rather than at production. It can interrupt the movement while it is in progress, or it can make the movement difficult or impossible by cutting the line along which it is to take place, or it can wreck the plants which produce the means of the movement. It is thus that a country adequately equipped in the air may hope to lay waste most easily and most decisively the enemy's logistical potential in a future war.

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[16] G. F. Henderson, *The Science of War*, p. 1.

THE JET-AGE NAVY: FACTS AND FALLACIES

BY AIR MARSHAL SIR ROBERT SAUNDBY, K.B.E., C.B., M.C., D.F.C., A.F.C.

IN the winter number of AIR POWER there is an enthusiastic article by Mr. John W. R. Taylor entitled "Jet-age Navy," which seems to me to contain so much that is arguable that I feel impelled to take up the challenge. While it is evident that Mr. Taylor fervently believes in what he writes, he makes a number of statements and asks a number of rhetorical questions that should not go unanswered in a journal like AIR POWER, which is read by so many of the younger and more thoughtful officers and airmen.

I realize that in this matter I will have to go cautiously, as I do not want to fall foul of the Editor by referring to "acrimonious Service jealousies of long ago,"* and yet I feel that I must make another effort to dispel some of the smoke-screen surrounding this subject of sea and air power. This can best be done by a dispassionate survey of the facts.

Mr. Taylor begins by saying that if the early trials of bombers against battleships had been properly analysed, the results would have been of immense value. I certainly agree, but, as he points out, the trials "sowed the seeds of an intense inter-Service rivalry" which, especially in America, has bedevilled the whole question ever since.

It was not the fault of the British or American airmen that the trials were not properly analysed. They had the best of reasons for wanting to arrive at the truth, but the sailors approached such trials with reluctance, and were mainly concerned to prove that battleships could more than hold their own against air attack. It was, indeed, their steady refusal to face the facts of modern war that caused both the "intense inter-Service rivalry" and the failure to draw the correct deductions from the trials.

Since the war naval writers have tried to paint a very misleading picture of what happened during the inter-war years and on the outbreak of the Second World War. They would have us believe that the Air Force neglected naval aviation, starved the Fleet Air Arm and Coastal Command of efficient aircraft, and was uninterested in the problems of anti-submarine warfare and convoy protection. They suggest that the Admiralty struggled in vain to make the Air Staff, engrossed in building up Bomber and Fighter Commands, realize the important contribution that air power could make to the safety of our sea communications. They would enlist our sympathy for the plight of the Admiralty when war came, with no effective aviation of its own, left to struggle against the submarine as best it could.

The truth is almost the exact opposite of this picture. All through the years between the two wars the Air Ministry strove to make the Admiralty realize the vast changes which the coming of air power would bring about in warfare at sea. The Naval Staff would never admit that aircraft could be a real threat to large warships, and the idea that aircraft could, by themselves, sink submarines seemed to them quite fanciful. After war came in 1939 the early claims by Coastal Command aircraft to have destroyed U-boats were not taken seriously by the Admiralty.

I well remember the rules under which we used to play air-sea war games between the Naval and Air Force Staff Colleges. Under these rules, laid down by the Naval Staff, one hit on a battleship by an air-borne torpedo produced no appreciable results, and it took *six* hits by torpedoes to reduce a battleship's speed by three knots. The number of hits required to sink a battleship was not, as far as I can remember, laid down—perhaps because such a possibility was regarded as utterly remote.

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* AIR POWER: Vol. I. No. 2, page 125.

We were always told by the Navy, and it was stated more than once in Parliament by a First Lord introducing the Naval Estimates, that the new "Asdic," as fitted to destroyers and other anti-submarine vessels, was so effective that the submarine menace was virtually a thing of the past. At no time, prior to 1939, did the Naval Staff urge the Air Ministry to provide a large number of long-range aircraft for shore-based anti-submarine work.

It is sometimes suggested by naval writers that the Fleet Air Arm, when war came, was equipped with unsuitable aircraft, owing to the Air Staff's ignorance of the correct operational requirements for naval aviation. They point out that the Admiralty obtained full control of the Fleet Air Arm only in 1937, which was too late to put the matter right. In fact, of course, the Admiralty were always very fully consulted about the requirements for Fleet Air Arm aircraft, and the aircraft they got were those they said they wanted. They frequently insisted on the incorporation of their ideas, perhaps not always very wisely, against the advice of the Air and Technical Staffs at the Air Ministry. After 1937 the Joint Operational Requirements Committee, on which the Admiralty and Air Ministry were represented, was dissolved at the request of the Admiralty.

I recall these matters, not in an attempt to prove that the Air Staff was always right—it made its fair share of mistakes—but because it is wrong that the Air Staff should be blamed for a state of affairs for which the Naval Staff were certainly not without responsibility.

Mr. Taylor says that "if the more extreme proponents of air power had had their way in the 1920's and 1930's, there would have been no effective Naval power at the outbreak of war in 1939." I do not know where these extremists were to be found. They certainly were not in responsible positions in the Air Ministry, nor can I recollect ever having met one of them. Mr. Taylor goes on to ask how we could have survived the U-boat blockade "if we had not been able to protect our convoys with hastily built escort carriers and hastily converted merchant carriers." This sentence does, in fact, spotlight the real cause of disagreement between the Naval and the Air Staffs during the inter-war years. If the Naval Staff had realized the value of aircraft in dealing with the submarine, they would have made proper provision for their use and it would not have been necessary hastily to improvise these ships on the outbreak of war.

The truth is that the Navy, in both world wars, did not regard the protection of our merchant shipping and anti-submarine warfare at sea as its main task. In the First World War the Admiralty concentrated mainly on the Grand Fleet, and their object was to bring the German High Seas Fleet to battle and destroy it. It was not until the mounting losses of our merchant tonnage brought us within sight of disaster in 1917 that they realized, almost too late, that they might utterly destroy the High Seas Fleet and yet lose the war at sea. Even in the Second World War there was far too much pother about the German heavy ships which, as events proved, did us very little harm, and not enough concentration on the real threat to our existence, the U-boat.

I should be happier if I could believe that, even now, the Admiralty fully realized that its task, if another war should come, would be the protection of convoys and anti-submarine warfare at sea. But their pre-occupation with Fleet carriers and jet aircraft and, still worse, talk of super-carriers like the U.S. *Forrestal*, makes me wonder if, even now, they have their eyes firmly on the ball.

Mr. Taylor goes on to ask some questions which he does not answer, so I will try to do so for him. Arguing in favour of the escort carrier, he says "Does it make sense to send a land-plane 1,000 miles, perhaps in bad weather, to try to locate a convoy in mid-Atlantic, so that it can fly around for an hour or two before travelling another 1,000 wasted miles home?"

Well, even if we admit that in the ocean areas remote from shore-based air power there are advantages in having aircraft based nearer to the convoy they are required to protect, this does not mean that the escort carrier is the only, or even the best, way of solving the problem. It is worth while analysing the results of anti-submarine warfare in the last war in order to see what methods proved most effective, and what part carrier-borne aircraft played in the campaign. Below will be found a most interesting table setting out in detail the agreed figures for enemy submarine losses—German, Italian and Japanese—during the Second World War. This shows that out of a total of 907 submarines sunk or destroyed (not counting those destroyed by bombing before commissioning,

Serial	*Sunk by*	*German*		*Italian*		*Japanese*		*Totals*		*Grand Total*
		Br.	*U.S.*	*Br.*	*U.S.*	*Br.*	*U.S.*	*Br.*	*U.S.*	*Allied*
1	Surface ships alone* ...	207½	38½	35	2	5½	64½	248	105	353
2	Ships and shore-based aircraft	12	4	2½	—	½	1½	15	5½	20½
3	Ships and carrier-borne aircraft	4	3	—	—	—	2½	4	5½	9½
4	Ships, mines laid by ...	16½	—	—	—	1	—	17½	—	17½
5	Total ships (surface) ...	**240**	**45½**	**37½**	**2**	**7**	**98½**	**284½**	**116**	**400½**
6	Submarines	19	2	19	—	2	23	40	25	65
7	Total surface ships and submarines	**259**	**47½**	**56½**	**2**	**9**	**91½**	**324½**	**141**	**465½**
8	Carreir borne aircraft alone	15	29	1	—	—	8	16	37	53
9	Carrier borne aircraft and surface ships	4	3	—	—	—	2½	4	5½	9½
10	Carrier—air, mines laid by	1	—	—	—	—	—	1	—	1
11	Total carrier-borne aircraft	**20**	**32**	**1**	—	—	**10½**	**21**	**42½**	**63½**
12	Shore-based aircraft alone	198	48½	8	1	—	4	206	53½	259½
13	Shore-based aircraft and surface ships	12	4	2½	—	½	2½	15	5½	20½
14	Shore-based air, mines laid by	16	—	—	—	—	3	16	3	19
15	Total sunk at sea by shore-based air	**226**	**52½**	**10½**	**1**	**½**	**8½**	**237**	**62**	**299**
16	Bombing (U-boats in commission only)†	21	42	1	2	—	—	22	44	66
17	Total by all shore-based aircraft	**247**	**64½**	**11½**	**3**	**½**	**8½**	**259**	**106**	**365**
18	Total by aircraft all types	267	126½	12½	3	½	19	280	145½	428½
19	Total by ships, submarines and aircraft, all types ...	525	175	69	5	9½	110½	603½	290½	894
20	Other causes—wrecks, unknown, etc.	82		11		10		103		103
21	Grand Total	782		85		130		—		997

* A kill shared is counted as ½.

† Does not include U-boats destroyed before commissioning, *i.e.*, building and in transit via canal or rail from inland factories. Command 6843 + 1 in Serial 10.

This table is based on the White Paper, Command 6843, presented to Parliament by the First Lord of the Admiralty, June, 1946.
(Note: One additional loss, reported since June, 1946, has been added.)

ERRATA

1. Page 246, line 17: for "907" read "997."
2. Page 246. The Table:
   Serial 5: for "98½" read "68½."
   Serial 17: for "64½" read "94½."

e.g., in building yards or in transit on inland waterways, etc.) a total of 465½ was accounted for by surface ships and submarines, and 365 by shore-based aircraft. The number destroyed by carrier-borne aircraft, alone or in co-operation with ships, was 63½. It is worth noting that aircraft of all sorts accounted for a total of 428½—more than the total of 400½ destroyed by surface ships alone, and not much less than the total of 465½ attributed to surface ships and submarines. Taking Mr. Taylor's figures†—which refer to German U-boats only—ships of all sorts and carrier-borne aircraft, i.e., sea power, destroyed 341½ U-boats, while shore-based aircraft, i.e., air power, destroyed a total of 325½, not very much less. But the striking thing, to my mind, is the very small proportion destroyed by carrier-borne aircraft, less than 6½ per cent. of the grand total. If we leave out the kills shared between carrier-borne aircraft and ships, the number drops to 54, less than 5½ per cent.

It is clear that carriers, including escort carriers, were much less efficient at destroying submarines than is generally believed. Indeed, if the Allies had possessed no carriers at all, the total number of U-boats killed would have dropped from 997 to 933½, a negligible reduction. But it is fair to point out that the results of U-boats destroyed may not tell the whole story. It is on record that convoys escorted by carriers enjoyed a very low loss rate, and it is therefore arguable that escort carriers, though not much good at destroying U-boats, had a strong effect in frightening them away and thus preventing them from making effective attacks on the convoys.

My deduction is that submarines can best be destroyed by being hunted—not necessarily in the vicinity of convoys—by shore-based aircraft, surface ships and submarines, to put them in order of comparative effectiveness. But there remains the point that escort carriers had a deterrent effect on U-boats trying to attack convoys, and there is therefore a case for providing escorting aircraft based on the convoy itself.

If this is agreed, what is the best way of providing such a mobile aircraft base? The great drawback of the carrier is that all the escorting aircraft are carried in one ship, the loss of which would remove all the local defence aircraft. And the coming of guided and homing air missiles or under-water torpedoes seems to me greatly to increase the threat to ships at sea. A ship is a large mass of metal floating on the sea and would seem to be the sort of target against which it should be relatively easy to employ homing missiles.

Now that aircraft are available which can take off and land vertically, there would seem to be great advantages in distributing the aircraft among all the suitable naval and merchant ships in the convoy. The helicopter would be quite adequate for spotting submarines at periscope depth, and attacking them by means of depth charges, small rocket missiles and cannon fire, and for co-operating with the naval escorting ships. The helicopter could not be expected to deal with a surfaced submarine, unless it was surprised and unable to make full use of its anti-aircraft defences, but I imagine that, in the vicinity of a convoy, the presence of naval escorting vessels would keep submarines at least at periscope depth.

In addition, every suitable ship in the convoy could be given facilities for launching guided and homing ground-to-air missiles and light anti-aircraft guns for close-range defence against air attack.

This policy of spreading the defences among a number of ships might complicate the problem of control, but it would mean that all the eggs would no longer be carried in one basket, and the loss of any one ship would not seriously deplete the local defences of the convoy.

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† Air Power: Vol. I, No. 2, page 131.

Mr. Taylor asks a number of other questions, which are listed below:

(1) "How could we have landed immense armies in Europe in the summer of 1944 without the shield and strength of the Royal Navy?"

Mr. Taylor seems to have little idea of the real factors which made possible the safe conduct of our sea-borne invasion of Europe. It was not "the shield and strength of the Royal Navy"—the Navy was not noticeably stronger in the Channel in 1944 than in 1941—but the general air situation that made the operation possible. In particular, it was the strategic bombing of Germany by the Allied Air Forces that broke German air power and gained for us an almost total air superiority. Without this all the warships in the world could not have guaranteed a safe crossing, or enabled us to maintain our supply services across the Channel.

(2) "How could the U.S. Air Forces have found bases for bombing Japan into submission if sea power had not landed the hard-fighting Marines and other troops on a score of enemy-held islands?"

The answer is that it was the short range of bombers at that time that made such operations necessary. Had bombers with an adequate radius of action, such as the Americans now have, existed then, Japan could have been defeated by air power without the need for most of these difficult combined operations which were very costly in lives and material.

(3) "Is there any doubt of the value of naval artillery support before and after D Day in Normandy?"

No doubt naval supporting fire is of value in a combined operation, but we must not lose sight of the scale of these things. Over 5,000 tons of bombs were delivered by Bomber Command alone during the preceding night with great accuracy, using the "Oboe" technique at very short range, against the coastal batteries, and thousands of tons of bombs by the Tactical Air Forces on D Day itself, against other key points. The tonnage of the high-explosive shells fired by the flat-trajectory naval guns was, by comparison, insignificant. I do not doubt that, had there been no naval supporting fire, the troops would have got ashore on the same time-table, and there would have been little or no difference in the conduct of the subsequent operations. In other words, such support is tactically useful but not essential, and is certainly no valid reason for maintaining warships as mobile gun platforms for such a purpose.

(4) "Or of the superb achievements of British carrier-based aircraft in Korea . . . in support of United Nations ground forces—even during the period when the Communists held all the airfields in North and South Korea?"

The answer is, I think, the same—that such support was tactically useful, but not essential. If the United Nations armies in Korea had been forced to depend entirely on air forces based in Japan, the air support might possibly have been less effective than it was. But there is no evidence to show that the carrier-borne air support was a vital, or even an important, factor in enabling the United Nations forces to hang on to the Pusan area until reinforcements arrived. The Americans had gained much experience, in the Pacific, in the task of supporting land forces from bases much farther away than were those in Japan from the Pusan battlefields.

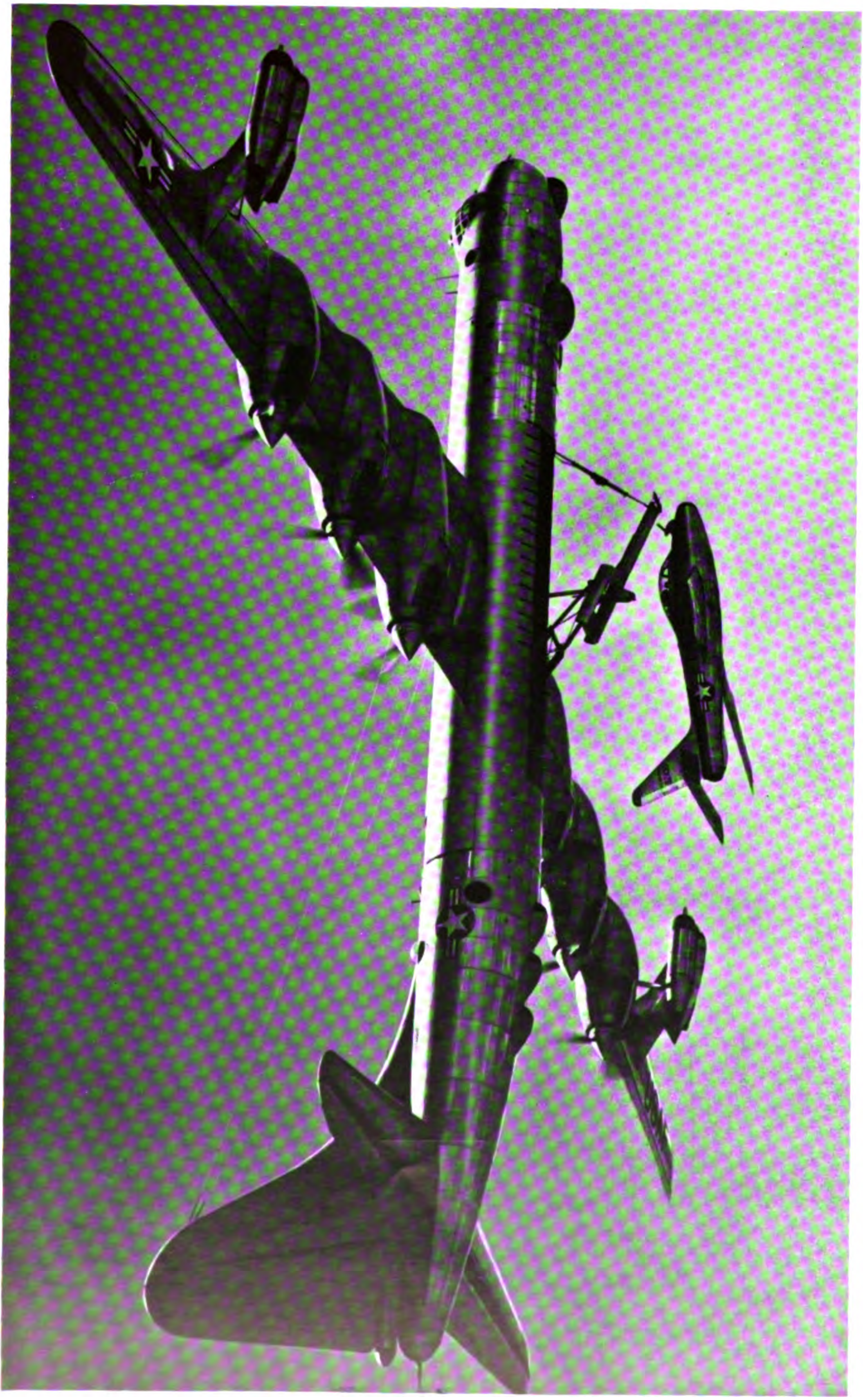
And we must not forget the special nature of the Korean War. The enemy deliberately left our carriers alone, and refrained from attacking them, just as we refrained from attacking his air bases on Chinese territory north of the Yalu River. These restrictions were imposed by political considerations, designed to localize the fighting. It would be very rash to deduce from these experiences that, *even in a limited war*, carriers would always be able to provide effective support for land forces. There was one occasion in the war against Japan, at the capture of Leyte, where the Americans tried to rely on carrier-borne aviation for the support of an invasion. They avoided disaster only by good luck and very hard fighting and, in the words of the official historian, "carrier-based air power had been shown, once again, to be no substitute for land-based bombers and fighters in support of a beach-head." The Americans were tempted to take this risk only because they thought—wrongly, as it proved—that the Japanese air forces were in a state of utter demoralization. Leyte taught them a severe lesson, which was not forgotten when future operations were being planned.

The remainder of Mr. Taylor's article deals with improvements in carrier technique, such as steam catapults and the angled deck.

In conclusion, I would not like Mr. Taylor to think that I do not realize the vital importance of safeguarding our sea communications in time of war, or that I suppose that any foreseeable development in air transport can do much to lessen that importance. But that does not mean that I believe, as Mr. Taylor seems to believe, that the Navy should turn itself into a sort of air force specialized for work over the sea, operating jet aircraft from larger and ever more expensive carriers. I sincerely hope that we shall see no such development.

The exercise of air power, whether over land or sea, is the business of the Royal Air Force, and—like the air ocean in which it operates—air power is indivisible. The future of the Royal Navy must lie on and under the sea, in the exercise of sea power. To avoid misunderstanding, I would add that it is reasonable for the Navy to control all aircraft embarked in ships for the purposes of convoy protection and anti-submarine warfare at sea.

With their responsibilities thus clearly and simply defined, the Navy and the Air Force *can* achieve a real unity of purpose, and together build an efficient and economical organization for the protection of our sea-borne supplies and trade.



The U.S.A.F.'s new B.-36-Thunderstreak long-range atom-bombing team, described in this article

NEW TRENDS IN BOMBER AND FIGHTER DESIGN – AND WHY

By John W. R. Taylor

NOW that the first squadron of Supermarine Swift jet fighters has been formed in Fighter Command, the re-equipment of the Royal Air Force with really modern, efficient aircraft can be regarded as under way. Soon will follow the first squadrons of Hawker Hunters, then Valiant bombers and, later, Vulcans, Victors, and Javelin all-weather fighters. By the spring of next year, we were told in the Air Estimates recently, "we shall be able to direct about twice as many formations of fighters against enemy bombers as we can now"; and "more than half our regular day force will consist of British swept-wing fighters." Nor is that all, for "because of the immensely improved cannon which the Hunter and Swift will carry the rate at which the day fighter force as a whole will be able to hurl high-explosive against the enemy will be increased by more than nine times." And, later, air-to-air guided rockets will make them even more formidable.

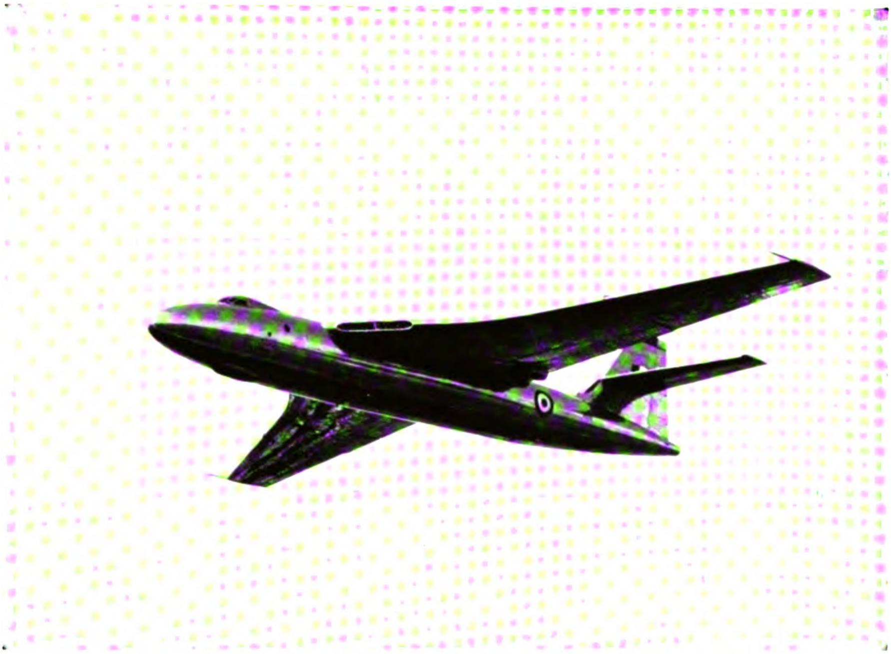
Meanwhile there has been a very welcome transfusion of more than 350 Sabres from Canada; and Bomber Command has around a dozen squadrons of Canberras. The obsolete Washingtons are being returned—with grateful thanks—to America. Venoms are exceeding their expected performance, and may even better the MiG-15 at altitude. Altogether, a very much more encouraging picture than a year ago. But how far have we gone towards meeting the full challenge of the changing requirements of defence in an atomic age?

Before answering that question, it may be as well to take a quick look at Britain's position and prospects in the light of a future total war. Obviously I write with no special knowledge of high strategy; but one thing seems abundantly clear—that the British Isles are of immense potential value to the United States, as one of the ring of advanced bases for her air striking power; but of no earthly use to Russia. It would require an impracticably strong army to occupy and hold down a country so closely packed with 50,000,000 inhabitants who cannot produce enough food to take care of their own appetites, let alone those of a garrison.

Air bases in Britain would be of little more use to Russia than air bases on the Continent for attacking the United States. So, obviously, Russia's first aim in any East-West war would be to neutralize Britain by atomic bombing, followed possibly by use of paratroops and certainly by submarine blockade. The Royal Air Force is our only weapon against the first, our best defence against the second and, with the Navy, responsible for dealing with the third.

The primary, vitally important aim must be to have an air force so strong, when combined with the air forces of our allies, that no enemy will dare to start a war. If this proves impossible, and a war does start, it will be equally important to take up the offensive from the very first minute, to destroy the enemy's bases; and to form an efficient fighter screen as far as possible from the United Kingdom—for if only 10 per cent. of a force of a hundred atom bombers, possibly with hydrogen bombs, broke through our fighter screen, they could inflict almost irreparable damage. Similarly, it would be essential to keep an enemy far enough away to prevent the use of V2-type rockets from bases on the Channel coast of France.

This, then, must be the aim of our present planning. How far have we got towards fulfilling it?



The Vickers Valiant swept-wing bomber

AIRCRAFT FOR THE ATTACK

At the moment, apart from a few fast-disappearing Washingtons and Lincolns, Bomber Command is a force of Canberra light bombers. But the term "light" is, of course, comparative. Our best heavy bomber at the start of the Second World War was the Wellington, which could carry 4,500 lb. of bombs over a range of 1,200 miles at about 145 m.p.h. Its crews had to rely on their own skill to find and bomb the target, with the result that by September, 1941, only one out of every ten R.A.F. bombers sent to attack the Ruhr had ever got to within five miles of its proper target.

Now look at the Canberra *light* bomber. Photographs of one typical bomb load showed two clusters of three 1,000-lb. bombs; and we know that it will carry small atomic bombs, with a destructive power equivalent to thousands of tons of high explosive. Its speed is around 600 m.p.h. and its range up to about 2,000 miles, at an operating height which makes it an extremely elusive target for any jet fighter now flying.

This is the aircraft on which we depend for our striking power until the big "V" bombers are ready; and it is tailor-made for the job—a powerful, effective tactical bomber, designed to pin down an enemy army and air force, while U.S.A.F. long-range "heavies" take care of strategic targets with the world's biggest stockpile of atomic bombs.

A glance again at the map will show why American and British strategic bombers are developing along completely different lines. If *we* could not hold back an aggressor, we would have no opportunity for strategic bombing anyway—hence our concentration on building up a force of more than 500 Canberras as quickly as possible.

Compared with America, we have only a relatively short distance to fly to our most important strategic targets. This fact, combined with a defence budget that would not meet the cost of a very large force of heavy bombers (a Convair B-36 costs some £1,300,000), has produced a new generation of British bombers—the Valiant, Victor and Vulcan—that will carry very heavy loads over medium ranges, very fast and at very high altitudes.

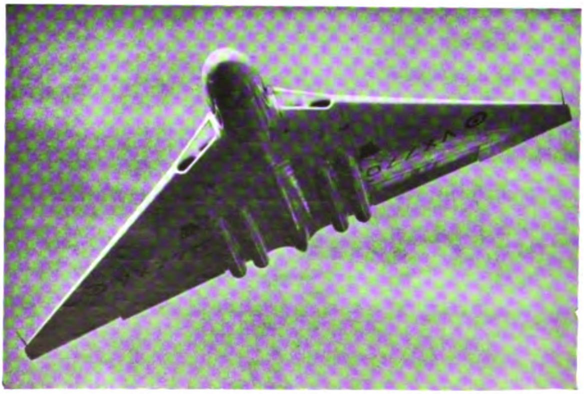
The U.S.A.F., on the other hand, in ordering some £100,000,000 worth of eight-jet B-52 Stratofortresses, has gone for a bomber with very long range, medium bomb load, high speed, and only a moderate operating ceiling. The differences are so marked that it seems impossible that both the U.S.A.F. and the R.A.F. can be right—until one analyses the completely different operational requirements.

Being able to afford only, say, a hundred "V" bombers, we should want them to do as much damage as possible every time they flew into action. One atomic bomb, properly dropped, would take care quite effectively of one main target. But we might not have sufficient atomic bombs available to deal with every target. The next best thing is to drop a very heavy load of high explosive from each aircraft dispatched, so that a small force can do a lot of damage. Alternatively, even if we had a large number of atomic bombs, it would be sensible to load two or three of them on to one aircraft, which could then attack three successive targets during one flight, rather than send out three bombers, or one bomber three times.

In addition, we could never afford to wage a war of attrition with an enemy fighter force, in the way that the United States 8th and 9th Air Forces did over Europe in the Second World War. So we have designed our big bombers to fly at 60,000 feet or more, where they would be extremely difficult targets for enemy fighters or anti-aircraft defences; and to fly at speeds approaching the speed of sound, so that enemy fighters would have to fly faster than sound to catch them, and so have their aim spoiled by "sound barrier" compressibility shock-waves. Because of this, we have been able to dispense with the usual defensive gun turrets and the need for escort fighters.

The latitude left to designers even by such requirements is shown in the varied configurations of the Valiant, Victor and Vulcan, which are respectively swept-wing, crescent-wing and delta-wing. This is no place to discuss the aerodynamic advantages of each—but there seems little doubt that Britain's faith in the delta will be justified by the Vulcan bomber and the Javelin all-weather fighter, while Handley Page claim that the Victor will carry more bombs farther, faster and higher than anything else in its class.

With the Victor and Vulcan both in production, it seems likely that the smaller Valiant will be used often for photographic - reconnaissance and pathfinder duties, both of which are vital to the success of any bomber offensive. To carry out these duties properly it would have to fly much lower than the main bomber force, and high-speed "jinking" to elude the defences would put a heavy strain on its structure at low altitudes.



The Avro Vulcan delta-wing bomber

In consequence, its wings need to be extremely strong, which may account for the big farings which enclose the undercarriage of the new Valiant B-2 when retracted. It might well be better to hang the wheels underneath in such farings rather than cut holes in the wing for them.

A small force of Victors and Vulcans, with a rather larger number of Valiants, would seem to meet our strategic requirements for many years, therefore, especially when we have developed the air-to-ground guided atomic weapons for which Sir Hugh Lloyd pleaded so eloquently when A.O.C.-in-C., Bomber Command.

But what of America? Her present B-36's are still highly formidable aircraft, able to carry an atomic bomb over ranges of 10,000 miles, and with sixteen 20-mm. cannon to fight off the enemy. But their top speed of 435 m.p.h. at 40,000 feet is no longer good enough to escape radar-aimed gun fire and the first primitive ground-to-air missiles; so many of them are being modified to carry a Thunderstreak fighter-bomber in their bomb bays, to combine the bomber's range with the fighter's speed.

In action the B-36-Thunderstreak combination will take off with the fighter, carrying an atomic bomb, cradled under the bomber. A few hundred miles from the target the Thunderstreak will be lowered on a trapeze, dropped clear like a bomb and will then make its 650-m.p.h. hit-and-run raid, returning to its mother craft for the long return flight. The B-36 itself need never go near the target.

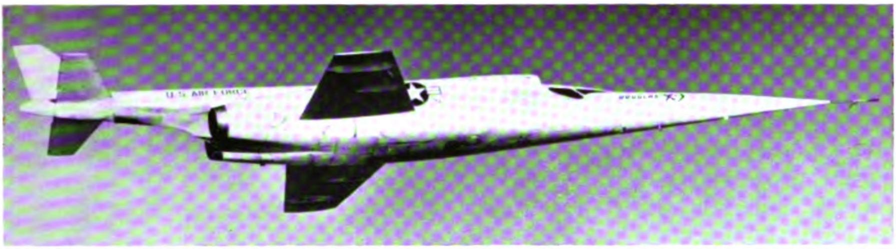
Such a scheme is probably only a stop-gap until B-52's are in service. These 160-ton giants will fly about 6,000 miles with a twelve-ton bomb load, and, having a ceiling of about 50,000 feet, may normally be provided with an escort of ultra-long-range fighters like the new McDonnell F-101 Voodoo. Long range is, of course, essential for U.S.A.F. strategic bombers, which, if denied bases in, say, the United Kingdom, would have to operate over ranges which in such an event might no longer concern the R.A.F.

With our "V" bombers and the American B-52's the trend of design of strategic bombers is almost certainly settled for several years. Convair are developing their XB-58 Hustler delta for the U.S.A.F., but it will be very like a Vulcan with B-52-type podded engines. Beyond it are efficient intercontinental guided rockets that will obviate the need for further big piloted bombers.

The U.S.A.F. already has *tactical* pilotless bombers, and the first operational squadrons of Martin B-61 Matadors are scheduled to arrive in Europe this summer. But they will almost certainly leave much to be desired in the way of accuracy and range for a few years and, meanwhile, there may be one or two startling developments in the way of piloted tactical bombers.

Obviously, with steady improvements in both piloted interceptors and ground-to-air guided weapons, the air between, say, 2,000 and 50,000 feet will become more and more unhealthy. The big "V" bombers have gone higher. There is a school of thought which predicts that tactical bombers will fly lower—under the radar, where the efficiency of missiles and interceptors will be immeasurably less.

It is suggested that a small, piloted bomber, with tiny stub wings just big enough to support it, and a single powerful turbo-jet, would have sufficient range to attack all worth-while tactical targets, and sufficient speed to elude any opposition in hedge-hopping attacks. It would not be a nice aeroplane to fly, as one can see by looking at the fantastic Douglas X-3 research aircraft, which is reported to be a test vehicle for the new formula. Larger and heavier than a Dakota air liner, its wings have a smaller span than the Dakota's tailplane, and its pilot is supposed to have said after its first flight that it did not seem to want to stay in the air. Nevertheless, the possibilities of an ultra-fast, stub-wing bomber, racing in at tree-top height to deliver baby atomic bombs, napalm or



The fantastic Douglas X-3 research aircraft. Prototype for stub-winged hedge-hopping tactical bombers?

rockets, would solve a lot of close-support problems where local air supremacy had not been achieved.

AIRCRAFT FOR DEFENCE

So much for the shape of our attacking force. How are fighter aircraft developing to meet the threat of an atomic war?

Obviously, from what has been written on the previous pages, the primary problems are to intercept and destroy very high-flying and very low-flying aircraft. There are few bombers that would attempt to battle their way past formations of Sabres, MiG-15's, Hunters or Swifts, unescorted, at medium altitudes.

At once we begin to realize the shortcomings of even the best of our current crop of single-seaters. In the rarefied atmosphere at high altitudes, air resistance to the aircraft is less; but the thrust of its jet engine falls off alarmingly. In fact, a jet engine like the R.A.14 Avon, which gives around 10,000 lb. of thrust at sea-level, produces only some 1,650 lb. at 50,000 feet. Use of reheat—which is to be standard on the Hunter and Swift—will help, halving the time taken to reach 50,000 feet and increasing the aircraft's operational ceiling. But it would almost certainly not be good enough if Fighter Command were called on to intercept bombers of the calibre of the Vulcan and Victor.

The obvious answer is use of rocket power, for the efficiency of a rocket improves with height, because it is independent of oxygen from the atmosphere. Main disadvantage of the pure rocket fighter is, of course, its high fuel consumption of about 300 lb. of propellant for each 1,000 lb. of thrust every minute. In other words, a rocket engine giving the same thrust as the R.A.14 would burn one and a third tons of fuel a minute.

The Luftwaffe tried to overcome this problem on its rocket-powered Messerschmitt Me.163 by gliding between bursts of rocket power, to increase endurance beyond the full-power figure of eight to ten minutes. A better answer is the combined jet-and-rocket interceptor, prototypes of which have already flown.

The British Hawker P.1072 and the American Republic XF-91 were basically jet fighters, with supplementary rocket motors to boost them to high speeds for take-off and in combat. More representative of future trends is the French S.N.C.A.S.O. 9000 Trident, in which the turbo-jets are secondary to the rockets. It is an advanced concept, simply designed to speed manufacture, and light weight, weighing only two and a half tons without its three and a half tons of rocket motors and fuel. Two 880-lb. thrust Turbomeca Marboré baby turbo-jets, mounted on the tips of its stubby, rectangular wings, are used for take-off and cruising flight. Three 2,755-lb. S.E.R.P. rocket motors in its fuselage give it a designed speed of 1,000 m.p.h. for four and a half minutes in combat. Most surprising of all, its ailerons are locked and it is controlled entirely by differential movement of its two downswept tailplanes and its fin.

Prototype S.N.C.A.S.O. 9000 Trident research aircraft, with mixed jet and rocket power, from which will be developed the S.O. 9050 interceptor

From the Trident, S.N.C.A.S.O. are developing a new interceptor—the S.O. 9050; and Republic Aviation in America are also building a jet-and-rocket fighter—the F-103. It seems inconceivable that, with such excellent liquid-fuel rocket motors as the Armstrong-Siddeley Snarler and the de Havilland Super Sprite already available and others on the way, Britain will lag behind in this vitally important field of fighter development. Indeed a combination of the high-lift qualities and big fuel capacity of the delta wing and mixed jet-and-rocket power seems to offer the best solution for comparatively small, single-seat, fast-climbing interceptors in the next decade.

Beyond them may come vertically launched, undercarriageless fighters on much the same lines, as these would be of special value for local defence of important targets in areas where airfields were not available, or for operation from small aircraft carriers, warships and merchant ships. They would carry a pilot, but would almost certainly be radar-guided for at least the first part of their flight. Able to reach 50,000 feet in about a minute (tests with Fairey V.T.O. rocket models at Woomera have shown that low acceleration launching is possible to save the pilot blacking out), such fighters would make one quick, deadly pass at an enemy bomber, firing homing rocket missiles, and then glide down to land on a rubber mat fitted with arrester wires. Landing would be comparatively slow, as, with their fuel exhausted, they would weigh very little. The U.S. Navy is at the moment testing two vertical take-off fighters, powered by supersonic turbo-prop engines, and such aircraft would provide invaluable protection for any type of ship, needing no lengthy take-off flight-deck.

Simultaneously with these aircraft, pilotless anti-aircraft guided weapons will also be developed—and already the Americans have a very effective rocket named Nike coming into service. But war-time experience with radio and radar counter-measures should warn us of the danger of putting all our faith in "electrickery." The simple invention of degaussing did much to reduce the menace of Hitler's magnetic mine; and it may prove equally possible to "bend" the beam of beam-riding anti-aircraft rockets or to neutralize the effectiveness of their homing heads. So it would be well always to keep a few piloted interceptors up our sleeve.

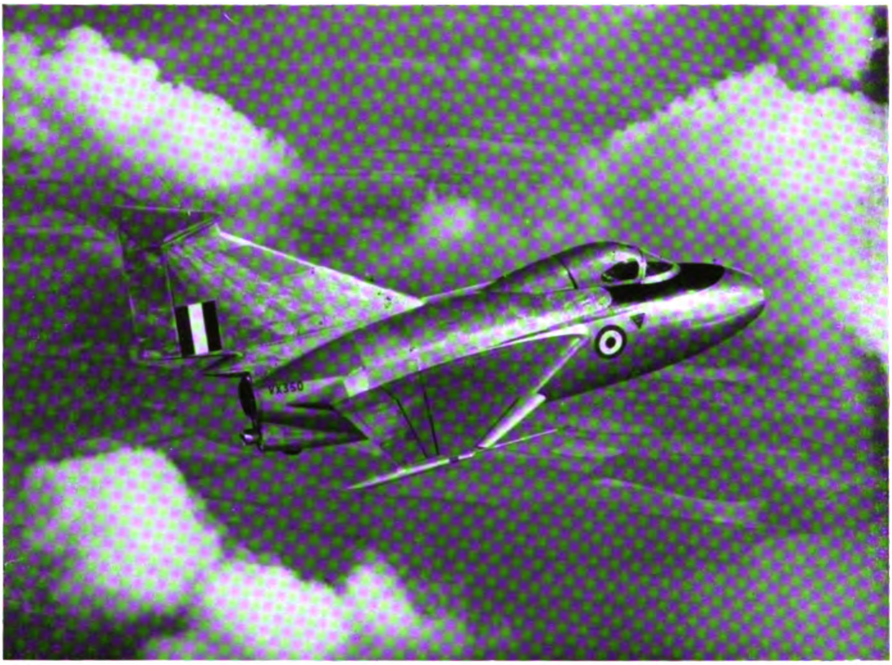
Fairey V.T.O. rocket model ready for firing on the Woomera Range, Australia

Nor is it altogether safe to assume that we have seen the end of the straightforward turbo-jet-powered single-seat fighter. The Royal Navy has ordered the swept-wing Supermarine 525, powered by two Avons, to protect its carriers from attack; and de Havilland have announced the existence of a very high-powered new turbo-jet named the Gyron, which has been designed especially for supersonic fighters. But, although such aircraft would offer longer endurance than the jet-and-rocket fighters, their loss of performance at altitude would be a serious disadvantage—unless they are considered as an effective challenge to fast, *low-flying* raiders like the hedge-hopping, stub-wing tactical bomber. If they could take care of this type of aircraft they would be worth their weight in uranium. And they might also make very effective "Canberra replacement" fighter-bombers themselves.

For Britain, only one other class of fighter seems necessary—the all-weather two-seater. No favourite with those who are still clamouring for simplicity and lightness despite the 14-to-1 "kill ratio" of the complex heavy Sabre over the simple light-weight MiG-15 in Korea, the all-weather fighter will continue to get bigger and more full of "gimmicks." The two-seat Javelin delta, now in production for Fighter Command, weighs much more than a fully loaded Dakota air liner; yet its successors will be even bigger.

Such fighters need a vast number of radio and radar aids to enable them to find and destroy their enemy at night or in bad weather. They have to be guided by G.C.A. to within reasonable range of their target, at which point their own radar must take over to bring them in for the kill. The pilot might not even see the enemy bomber, except as a blip on his radar screen, for his air-to-air rockets and guns will probably be fired automatically by a kind of "proximity fuse" as soon as the enemy is within range.

Powerful engines are needed to ensure a high rate of climb and ability to overhaul fast jet bombers. A very heavy load of fuel is essential, for the all-weather fighter is no short-endurance hit-and-run interceptor. All of which adds up to a big, heavy, complex aeroplane—so big that American reports give the all-up weight of Avro Canada's projected new CF-105 two-seat, all-weather



Fairey F.D.I. delta-wing research aircraft (jet-powered) of which the V.T.O. model is a half-size replica. The F.D.I. is not vertically launched

delta as thirty-four tons, which is twice the loaded weight of the Wellington "heavy" bombers of the Second World War.

It is always dangerous to make predictions about aviation development, and unexpected successes in the evolution of guided weapons, atomic propulsion or other techniques may make unnecessary or pointless some of the trends in fighter and bomber design which seem logical at the moment. But whilst hoping for miracles we should base our plans on logic. The Luftwaffe would have fared better in 1944 and 1945 if Hitler had not sacrificed normal aircraft development on the altar of fantastic "secret weapons" that could not be perfected in time to avert disaster for Nazi Germany. Our survival in turn depends on striking the proper balance between what is possible today and what might be possible in two years' time, if we had two years to spare.

[*The views expressed in this journal are those of the authors and are not to be construed as official opinions or policies.*—Ed.]

CHANGING THE FACE OF SOUTHERN RUSSIA

By Squadron Leader J. F. L. Long, M.A.

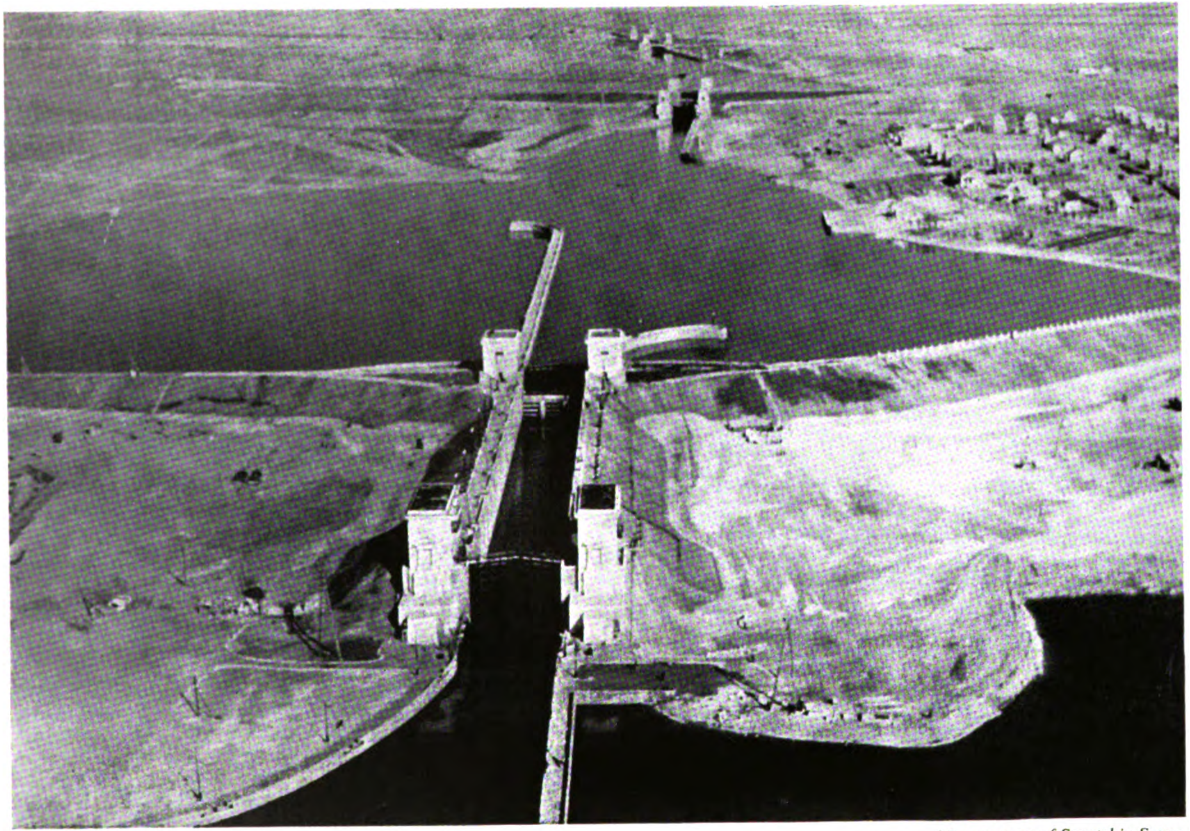
AMONG the more impressive Soviet economic developments since the war one must undoubtedly place the Russian Government's energetic prosecution of a three-prong policy for the construction of powerful hydro-electric stations, inland waterways and irrigation canals in the southern part of the Ukraine, in the Caucasus and in Central Asia. The sheer size of these developments is, even now, not readily appreciated in the West. Already, with the completion last year of the canal connecting the Volga and the Don, nearly 30,000 miles of waterways have been integrated into a single communications system with outlets to five seas. By 1957, when the other major construction projects are due to be completed, not only will Russia's output of electric power rise by over 100 per cent., but an area of at present semi-arid land twice the size of England and Wales will be receiving water for the first time. Perhaps more far-reaching, in terms of simple geography, are the probable effects of the irrigation schemes upon the climate of southern Russia. As a *Tass* reporter aptly put it some time ago, the aim is none less than "to correct Nature's mistakes."

Russia, after all, has always been something of a geographical curiosity. Much of the Russian land mass lies within the Arctic Circle; none of it lies within the tropics. The resultant climate, which is harsh and one of extremes, seriously hampers the exploitation of the country's mineral resources (notably in the north-east) and the cultivation of the land (notably in the south). The value of many of the great rivers as means of communication is reduced to nothing on account of this climate for long periods each year. Communications, moreover, demand an east-west orientation of these waterways, but two only are thus orientated, and many of the more important, like the Ob, Yenisey and Lena, wastefully empty themselves into the Arctic Ocean.

Two centuries before the Soviet régime assumed power in Russia schemes were being produced for rectifying some of the grosser oversights of Nature. Peter the Great, for instance, conceived a plan for diverting the waters of the Amu Darya (the Oxus of old) into the Caspian Sea; he even ordered the digging of a canal to connect the Don to the Volga, but work had to cease because of the technical difficulties encountered.

More recently, at the turn of the century, came the first schemes for diverting the northward-flowing Ob southward into the Aral Sea, but again the technical problems proved insuperable. The new régime was from the first fired with the same intense enthusiasm for "correcting Nature" and, indeed, believed that in Marxism it had an infallible theory that would render Nature more amenable to rectification. The means, however, were still largely lacking and it was not until the thirties, and then as a result of the forced industrialization associated with the name of Stalin, that the dreams of centuries came some way towards fulfilment.

Chief among the pre-war schemes and typical of those that were to follow was the famous hydro-electric station, Dneproges, on the great bend of the River Dnieper. This was opened in 1932 and has an average annual power of 550,000 kW. The reservoir, created by the 115-foot-high dam, made possible the cutting of a canal through the left bank of the river and the opening of the river to navigation. The hydro-electric station provided cheap power not only for



[By courtesy of Sovetskiy Sovuz

An aerial view of one of the locks on the Volga-Don canal, opened to shipping in July, 1952 industry in the Ukraine but for agriculture also, and, for the first time in Russia, "electrified" husbandry was brought to the fields. The power was harnessed for irrigation purposes as well. Similar in conception though far greater in scope was the so-called "Great Volga Scheme," which was brought to a halt by the war. This scheme included the construction of some twenty hydro-electric stations, canals and irrigation works, and, in addition, the diversion of the waters of the northern-flowing Pechora, Sukhona and Vichegda into the Volga, most important of Russia's natural waterways. A canal joining the Don and Volga was started before the war, but had to be abandoned on the outbreak of hostilities.

In view of the extreme importance of this latter scheme, it is hardly surprising that the Soviet Government decided to press on with its implementation as soon as possible after the war, and, despite the great cost in manpower, to bring forward the original date of completion by two years. Though the Volga had its northern outlets via the Rybinsk reservoir to the Baltic and via the River Kama to the Arctic, there was still no outlet to the open sea in the south. Many construction difficulties had to be faced, however. Gravest of these was the great difference in the levels of the two rivers; where they run closest to one another (some miles north of Stalingrad) the Don is nearly 130 feet higher than the Volga. Topography presented another serious difficulty, for the land rises gradually east of the smaller river and drops sharply down to the larger.

Work began again in 1947 on the Volga-Don canal and the main installations were completed a few months behind schedule, in July, 1952. Even so, this was an impressive engineering achievement. The canal itself is sixty-three miles long, has thirteen navigation locks, and runs from Krasnoarmeysk, some miles below Stalingrad, to Kalach, on the Don. Some way below Kalach, at Tsymlyansk, a hydro-electric station with a capacity of 160,000 kW has been built. A dam has raised the waters of the Don 86 feet and created a reservoir some 106 miles long and, at its maximum, nearly twenty miles wide. An irrigation project "to bring water to the semi-arid and dry lands of Rostov and Stalingrad provinces" is linked with the canal scheme and is due to be completed in two years' time; some two million acres will be irrigated and a further five and a half million watered. It is planned to cultivate primarily wheat and cotton on this new land.

A still more impressive scheme is that relating to the two new hydro-electric stations on the Volga at Kuybyshev and Stalingrad, to be built by 1955 and 1956 respectively. The magnitude of this scheme, as Soviet apologists have emphasized *ad nauseam* during the past three years, surpasses anything previously undertaken by the régime. To judge from the published figures, the Kuybyshev station, with a capacity of 2 million kW, promises to be the greatest of its kind in the world. Even the Stalingrad station, rated at 1.7 million kW, will have a capacity of 400,000 kW more than the Boulder Dam hydro-electric station on the Colorado River. The irrigation and other associated works are planned on a similar scale.

Work began on both schemes in 1950 and is progressing fairly satisfactorily. When complete, the annual output of the stations is expected to be about 20,000 million kW-h, about half of which will be transmitted at up to 400,000 volts over distances of 500 and 700 miles respectively to the Moscow industrial region. Towns of the Middle and Lower Volga, collective farms in the Central Black Earth region and irrigation installations will receive the rest. Behind the dams at Stalingrad and Kuybyshev reservoirs some 300 miles in length and twenty miles wide will form. The consequent improvement in navigation conditions is expected to be considerable: the Volga's carrying capacity, for instance, may be raised by as much as 25 per cent. At Kazan the river, instead of flowing more than four miles to the west of the town, will be brought to the walls of the ancient Kremlin itself. Between Kazan and Kuybyshev about 2.5 million acres of dry steppe on either side of the Volga will be irrigated and turned over to corn.

From Stalingrad water will be conveyed eastwards from the reservoir almost to the River Ural, a distance of 400 miles, for the irrigation of 15 million acres in the north Caspian area where eventually orchards and pastures will thrive, the latter supporting cattle, sheep and horses. Power from the hydro-electric station will be used for irrigating a further 3¾ million acres in the vicinity of the canal itself and in the Volga-Akhtuba floodlands, where best quality cotton will be grown and silk produced. Canals will be built to provide water for nearly 14 million acres in the Sarpinsk lowlands and in the Black Earth region of the Nogaisk steppe. The shifting dunes, a feature of this area, are to be arrested by afforestation; large-scale stock raising will be encouraged, as well as the cultivation of cotton, jute and Bombay hemp.

A scheme affecting the development of industry and agriculture in the Ukraine and the Crimea was also announced in 1950. By this, at Kakhovka, about 150 miles below Dneproges, a new power station will be erected with a capacity of 250,000 kW. Two canals are to be constructed in conjunction with the Kakhovka station, one in southern Ukraine, the other in north Crimea, giving a total length of 550 miles of navigable waterways. Additional canals extending 225 miles will allow 3½ million acres of the southern steppes to be irrigated and water to be brought to no fewer than 700 collective farms. The whole work is due to be completed by 1957. Though there was, last July, some sharp criticism of the lack of progress at Kakhovka, it appears that work is now well ahead of schedule.

Last of the current major construction schemes is the Amu Darya-Krasnovodsk canal project, otherwise known as the Turkmen canal scheme.* Begun like the other schemes in 1950, the stated aim was to supply much-needed water and electricity for agriculture and industry in Central Asia. For twelve months now, however, no reports have been issued on progress made with prospecting, surveying and digging, and it would seem to be a fair inference that work, temporarily at least, has been brought to a halt and labour and machinery released for more essential tasks elsewhere.

The Turkmen scheme, for all that, is imaginatively conceived and would undoubtedly do much for the economy of the Central Asian region. Some ¾ million acres of at present unproductive land in the South Caspian plain, Western Turkmenia, the Amu Darya delta, the Kara Kalpak A.S.S.R. and the northern part of the Turkmen S.S.R. would be irrigated for cotton growing, and a further 17½ million acres in the Kara Kum desert—an area approaching the size of Scotland—watered to produce good pasture lands. A new town has already been built at Takhia Tash in the Amu Darya delta at the eastern end of the projected canal. The waters of the river would be diverted in a south-westerly direction into the bed of the ancient Uzboy River to empty themselves, not in the Aral Sea, but in the Caspian. The purely technical difficulties are undoubtedly formidable. Three hydro-electric stations, developing 100,000 kW, would also have been built along the canal.

These projects in themselves will do much, when completed, to alter the face of present-day southern Russia. But surpassing them in magnitude of its conception

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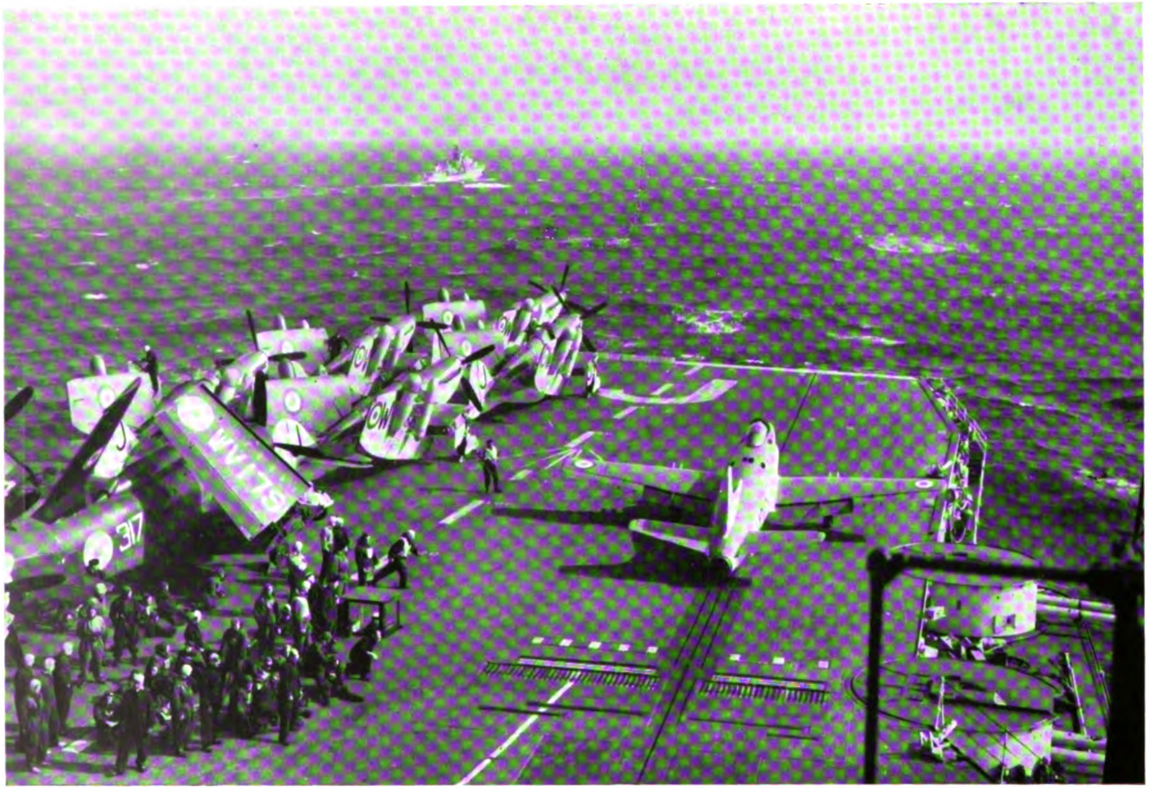
* There are, of course, a number of interesting subsidiary schemes, among them the Mingechaur H.E.S. (which will double the electric power supplies of the Azerbaijan S.S.R.), the Chu Valley scheme and the twin stations on the upper Irtysh at Ust-Kamenogorsk (commissioned last year) and Ust-Bukhtarma (now being built).

is the Ob-Aral project, sometimes called the Turgay Gates scheme, sponsored by an ambitious Soviet engineer named Davydov, who has apparently already obtained the blessing of the Soviet Ministry of Electric Power Stations for his project.

The basic plan assumes the completion of the schemes mentioned above and involves the construction of an artificial lake nearly two-thirds the size of the Caspian in the swamp region of western Siberia by damming the Ob at the little town of Belogorye, just below the confluence of the Irtysh. A wall some 250 feet high would rise and extend from the western to the eastern edge of the wide valley of the Ob. Davydov, however, does not consider that the waters of the Ob and its tributaries are in themselves sufficient to make the scheme work. A further dam, much smaller than the one at Belogorye, would have to be built across the Yenisey at Yeniseysk to create a reservoir which would extend 200 miles southwards, almost as far as the River Kan. The shallow and narrow canal at present linking the Yenisey with the Ob would be enlarged over its course of fifty-seven miles to allow the Yenisey to flow into the eastern end of the artificial lake.

The full scope of Davydov's plan can now be appreciated. As the waters of the artificial lake rise to inundate the swamp, they would flow southwards roughly *up* the course of the River Tobol, until they reach the base of the watershed between the West Siberian and the Turgay lowlands. Here a canal 575 miles long would have to be built to allow the waters from the artificial lake to flow into the Aral Sea and thence, along the routes already charted for the Turkmen canal, into the Caspian. The benefits from the scheme are expected to be enormous. A deep-water shipping route would be brought into being extending from Lake Baykal in the east to the Black Sea in the west and from the Arctic and Baltic in the north to the Caspian in the south. In addition the amount of irrigated land in Soviet Central Asia would be increased by 63 million acres; there would be sufficient cheap electric power to satisfy the needs of the industrial regions of the Urals, western Siberia and the Kazakh, Uzbek and Turkmen Republics; the present fluctuating levels of the Caspian—a source of difficulty for fishing and shipping—would be stabilized; and, finally, the existence of so great a volume of water might well lead to the much-hoped-for amelioration of the climate over a great area of Central Asia, though it is open to doubt whether the advantages will be as great as Davydov himself believes. It would, however, be foolish to speculate too much about a project that remains, and must remain for years to come, an ambitious notion, albeit a notion which, if present schemes are safe touchstones to judge by, the Soviet Government should not be incapable of putting into effect some day.



[*Admiralty Photo*

THE AIRCRAFT CARRIER

An Attacker jet aircraft being catapulted off H.M.S. "Eagle" during operations in northern waters. Firefly and Skyraider aircraft are parked on deck. H.M.S. "Scorpion" is the attendant destroyer seen in the picture.

THE NAVY OF THE FUTURE

By Rear-Admiral H. E. Horan, C.B., D.S.C., R.N.

BEFORE putting forward any ideas as to what the Navy of the Future, and the ships that will compose it, will be it is only right that the role of the Navy in war is clearly understood. It is to control the sea communications of these islands and the overseas Dominions and thus ensure that the men, weapons, food and raw materials which are essential to the conduct of the war pass safely along the great sea lanes. This has been its duty for centuries, and it is well understood that the Navy cannot do this on its own. The Army must make secure the bases from which the ship's work and the Royal Air Force must co-operate, in these days of air power, whenever and wherever it is in a position to do so—in fact the whole control of the commerce traversing the oceans and the security of the ports and bases is in the true sense of the phrase a Combined Operation.

Today and in the foreseeable future the menaces to our shipping and that of our allies are surface raiders, submarines, aircraft and the mine. It is the duty of the Admiralty to recommend adequate and timely provision in the shape of ships, aircraft and equipment against each and all of these forms of attack. At the same time sufficient forces must be available to act defensively against enemy forces endeavouring to dispute our right to see our shipping safely across the oceans and for the active support of the general offensive war strategy.

REBUILDING THE FLEET

The time is inexorably approaching when the great part of the ships composing the Fleet will need replacing. They are of war-time design and construction and soon will be "getting long in the tooth." The replacements must be designed and equipped so that they will be the best possible to deal with the enemies they are likely to meet.

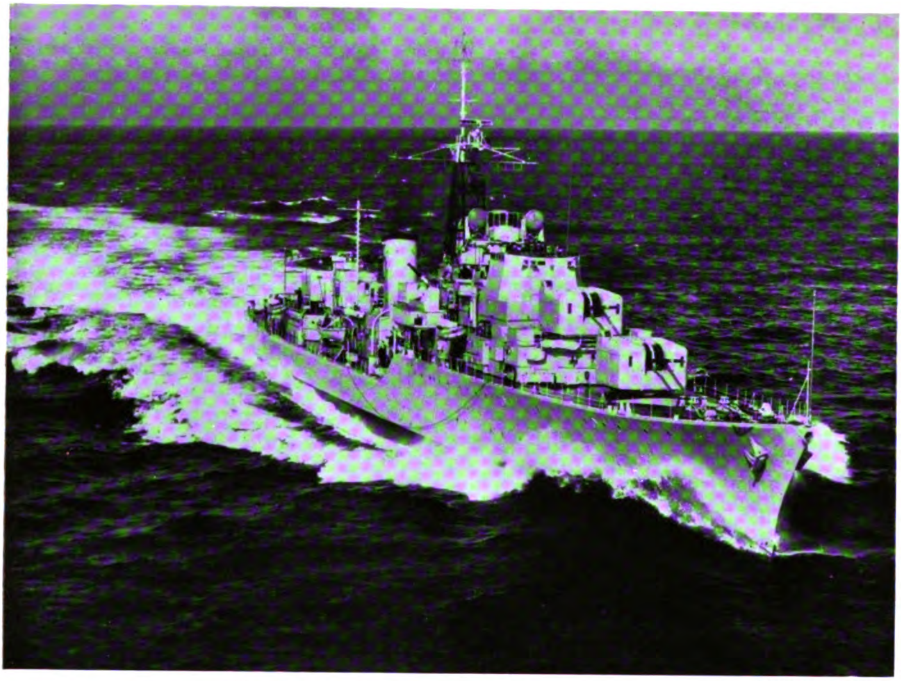
Since the end of the Second World War the following developments have taken place as far as sea warfare is concerned. First there is the submarine with higher underwater speed; second to this comes the high-speed long-distance aircraft; third are the strides made in mining technique; and then there is the guided missile and finally the atomic bomb. All these are natural developments in the forward march of science, but it is dangerous to suppose, as far as warfare at sea is concerned, that all the present ships and aircraft are the best that could be devised to combat these threats.

Future designs of ships and naval aircraft are quite rightly secret, but perhaps there is no harm in discussing the matter in the light of common sense.

PRESENT TYPES OF SHIPS

Before dealing with the Navy of the Future it is just as well to see what there is at present, and in view of the fact that nowadays building ships is a very expensive item, to see whether any ships of the present Fleet can be adapted to future needs.

First and foremost come the aircraft carriers. Only one new fleet carrier (the *Eagle*) has been completed since the end of the last war. She was designed during the war years but all the important lessons learned during that period have since been incorporated in her construction. Incidentally she cost something in the region of £16,000,000. A sister ship (the *Ark Royal*) is due for completion during 1954, so, in the not-far-distant future, there will be two of these up-to-date ships in the Fleet. The remaining five fleet carriers are all not only of pre-war design but have one and all seen strenuous service both during the war and since. Of



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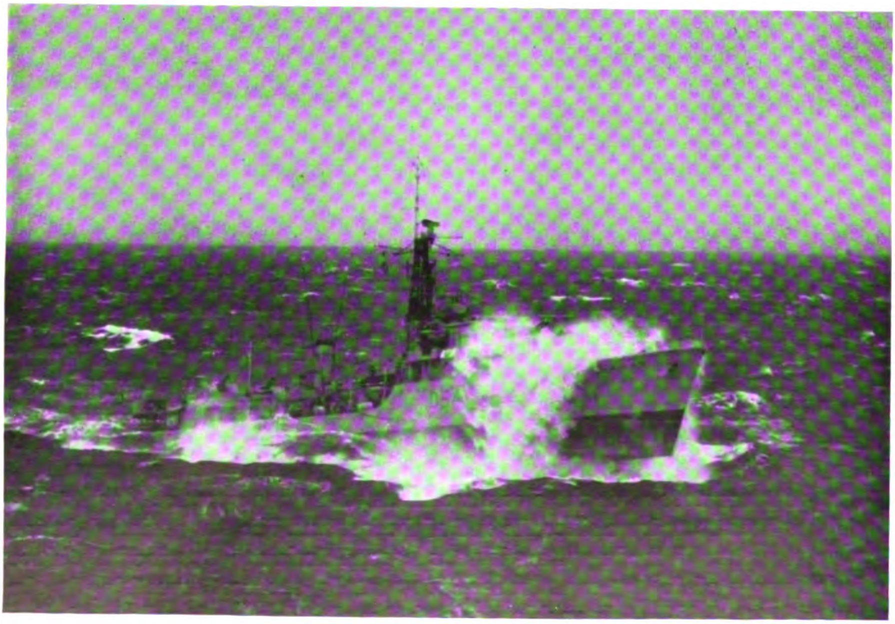
POTENTIAL CONVOY PROTECTION

H.M.S. "Daring," a very large destroyer, which owing to its size and complement comes within the category of light cruiser.



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THE DESTROYER—THE UBIQUITOUS TYPE OF SHIP

H.M.S. "Scorpion," fleet destroyer, lifts her nose out of the water while operating in heavy weather in northern waters.

these the *Indomitable* is in reserve and another, the *Victorious*, is being almost completely rebuilt. It stands to reason, therefore, that the three ships at present in commission, the *Indefatigable*, *Implacable* and *Illustrious*, are also getting old and cannot be considered as future ships of the first line.

However, apart from the *Eagle* and *Ark Royal*, fleet carriers proper, there are four of the *Hermes* class in various stages of completion. These are smaller than the *Eagle* class, but it is only right to assume that they will also be fitted with the latest equipment, including the new steam catapult and an angled deck (both British inventions) and thus capable of operating all forms of sea-borne aircraft in the foreseeable future. Thus perhaps they can be reckoned to a degree as "all-purpose" carriers.

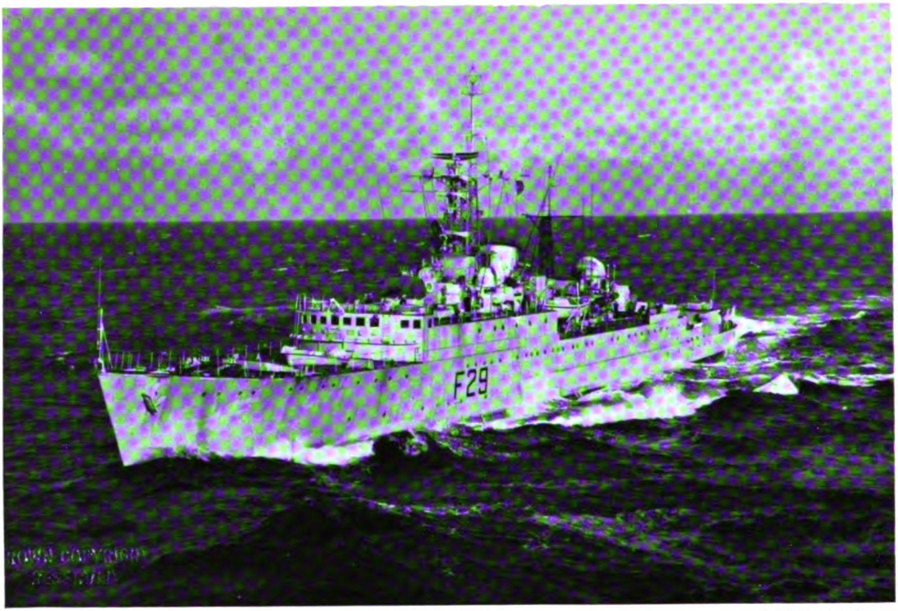
The next available type is known as "light fleets" and are smaller still and of lighter construction than either of the foregoing classes; in fact their hulls can be classed as Merchant Navy type. In the event of war they will be suitable for trade-protection work and will be able to give a good account of themselves in this role.

Counting those in the Dominion Navies and in various stages of completion their total is twelve. When one comes to remember that there were over fifty British carriers employed in commerce protection at various times during the last war, it looks as if at the moment we are under-insured as far as this type of ship is concerned, more so from the fact that the range and speed of the aircraft of our potential enemy has greatly increased. This makes it only right to assume that, in the event of war breaking out again, the Atlantic will become what the Mediterranean was in the last war and every convoy will have to fight its way through.

"Fighting through" a convoy at once brings to mind the need for cruisers with their surface and anti-aircraft armament, high speed and good sea-keeping qualities. Their A.A. weapons are most important from the point of view of dealing with any aircraft which may not have been intercepted by the fighters flown from the carriers. At the moment all the cruisers in the Fleet are of war-time construction and have seen much strenuous service. With the Commonwealth strength there are at present thirty-four in either active commission or in the reserve. Before the last war it was the accepted principle that at least seventy were required. Therefore there is a big deficiency in this type of ship. This can, of course, be made good by the employment of carrier-borne aircraft in sufficient numbers. Further, these cruisers are inferior both in speed and gun power to the Russian "Sverdlov" class though in some other respects they are probably better equipped, particularly in the electronic field.

There is a new type of ship known as the *Daring* class of roughly 3,300 tons displacement, of which there are eight in the Royal Navy either in commission or in various stages of completion, and a further four under construction in Australia. These are really very large destroyers which, owing to their size and complement, come within the category of light cruisers, but they are not armoured. They are good ships and no doubt would give a good account of themselves in whatever role they are destined for. Their potential trade protection role should not be disregarded.

Now we come to the ubiquitous type of ship known as the destroyer. In both world wars this class has shown itself capable of going anywhere and doing almost anything. But here again we find that they are all of war-time construction and therefore have seen much service. Destroyers were originally designed to deal with the menace of high-speed craft carrying torpedoes which endangered the battle squadrons. Fitted with a torpedo armament and capable of high speed



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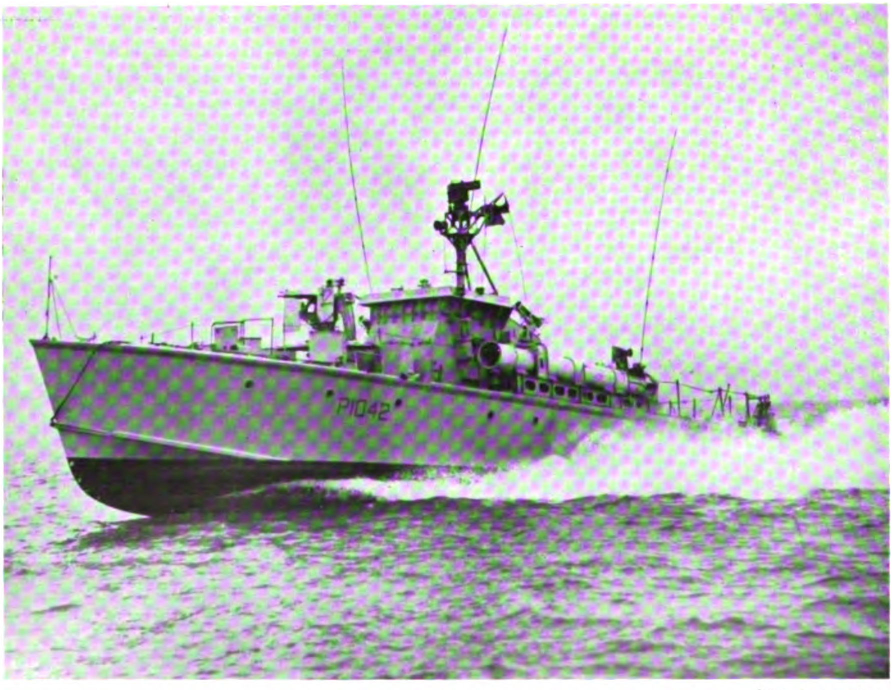
THE ANTI-SUBMARINE FRIGATE

Illustration of war-time frigate; newer types of simpler construction and higher speeds have already been launched.



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FAST PATROL BOAT

"Gay Bombardier" fitted as a torpedo boat. Much experimental work is going on in this direction.

themselves, they could also deal with any heavy ships in darkness and short visibility, and when they were fitted with Asdics they were good anti-submarine craft. An outstanding example of their traditional function was the sinking of the heavy Japanese cruiser *Haguro* in the Malacca Strait by five destroyers on their own in May, 1945. There have been rumours of Russian battleships being laid down but, failing confirmation of this, it is only right to see to what use we can put the destroyers we possess. The Admiralty is converting forty-four of the destroyers in reserve at the moment to what are known as anti-submarine frigates. This means a complete "rebuild" as far as the upper deck is concerned and the removal of their existing main armament to make way for the latest anti-submarine weapons.

The mention of frigates brings us to what is the most numerous class of ship in the Fleet at the present time. Roughly these are divided into two classes, viz., anti-submarine and anti-aircraft. They are all of war-time construction but it is good to see that new types are projected, and some of these have actually been launched. The advent of the submarine with a higher underwater speed has made the original frigates with their slow speed only fit for close escort duties. The fact that the destroyers mentioned above are being converted will fill this gap and it is understood that the new types will be ships of high speed. Further, some of the new types will be of simple construction and capable of being "mass produced." The ships earmarked for close air defence will have a new anti-aircraft armament and the latest form of control installations.

Now that mines of a wide variety of types can be laid effectively from aircraft, as was shown during the Second World War, the menace to shipping in enclosed waters from this form of attack has greatly increased. General Eisenhower (lately Supreme Allied Commander, Europe), Admiral McCormick, U.S.N. (Supreme Allied Commander, Atlantic) and Admiral Sir John Edelsten (Allied Commander-in-Chief, Channel), in discussing recent maritime exercises, have all drawn attention to this fact. That the Admiralty is fully alive to this is shown by their action in instituting a large new programme for coastal and inshore types of minesweepers. In addition, a new maintenance base for these craft has been formed in Southampton Water at the old B.O.A.C. flying-boat terminal. Further a new branch of the Royal Navy has been introduced with the title of the Royal Naval Minewatching Service which is manned by volunteers.

The submarines with the Fleet are nearing the end of their useful life, and as the First Lord said last year, an unstated number of new submarines are being built. They are still essential for offensive patrol work and many other duties.

That the fast coastal motor-boats, which made such a reputation for themselves in the Narrow Seas during the last war, have not been forgotten was clearly shown at the Coronation Naval Review. The introduction of new forms of propulsion for these and other craft have been mentioned from time to time and it is clear that much experimental work is going on in this direction. It must be remembered, however, that these are essentially "fine weather craft."

The largest query concerning the Navy of the Future is the battleship. At present there is one in commission and four in the Reserve Fleet. The former (the *Vanguard*) is being kept with the Fleet so that officers and men are kept acquainted with what the Admiralty call "battleship technique." This clearly shows that there must be some future for this class of ship. As the First Sea Lord recently pointed out, with their powerful gun armament and high speed they are today really super-cruisers and as such are a valuable adjunct to counter enemy surface raiding operations. But there is another use for which they are peculiarly fitted and that is to act as mobile platforms for guided missiles. Quite naturally, little information has become available as to what these missiles are like or can do. However, it is only right to assume that some of them must be of considerable size and the larger types will want special launching facilities. The hull of a battleship can provide the latter while her magazines and shell-rooms could be utilized for storage.

The mention of new weapons at once brings to mind the atomic bomb. As far as can be foreseen at present this weapon is singularly impotent *at sea*. To use it effectively against a convoy it must be transported to the position of release in an aircraft. This means that the aircraft has to penetrate the defensive screen of the convoy and this will be no easy matter if the latter has a properly organized and trained defence. In fact the convoy should be a very prickly and uneconomical target to tackle since it has such a high concentration of defensive weapons in its vicinity and ships are farther apart than people realize; in fact, there is 98 per cent. of water to 2 per cent. of ship in a normal convoy formation. Speaking as a naval officer, the writer is of the opinion that a convoy *at sea* is one of the safest places to be in the event of an attack by atomic bombs.

Now for the aircraft required by the Navy for use in the aircraft carriers. The first and perhaps the most important type is a very high performance fighter. This is essential for defending the ships at sea against air attack made out of range of effective shore-based fighter defence, and it is good to note that one such type has been put on the super-priority list and should be making its appearance at sea shortly. The other types for anti-ship strikes, reconnaissance and anti-submarine duties require particular designs and the A/S aircraft primarily need plenty of room for the crew with their weapons and instruments combined with long endurance and not particularly high speed. The helicopter will also become of increasing importance.

CONCLUSION

It is obvious that for the security of the sea communications the Navy is essential. The ships composing it will in effect differ little from those at present in service though the balance between types may continue to change. Long-distance cover plus immediate protection must be available for the ships as they traverse the oceans. This protection must be there all the time the ships are at sea and must be able to carry out all its duties in fair weather or foul. That an important part of this protection is air power goes without saying, but it stands to reason that for it to be fully effective it must be part of or, failing that, work in the closest co-operation with the surface forces. It cannot do the job on its own. Its value was proved in the last war when an increasing number of aircraft, either shore-based or carrier-borne, made their appearance on the trade routes or carried out operations designed to keep the submarine and air menaces under control. It must never be forgotten that, with the appearance of aircraft acting in conjunction with the surface forces, the losses suffered by merchant ships were thirty times less than they were when only surface escort was available.

There is one thing that the Navy of the Future must be, and that is ready and capable of immediate action from the word "Go." There will be no time to provide the ships and their weapons and, more important still, train the officers and men to fight them. There will be no "phoney" or "twilight" war. The first few weeks or even days will be a dangerously decisive phase, though quite possibly followed by a long war of attrition. It therefore stands to reason that the Navy with all the other forces of the Crown must be ready to swing into action at once, and therefore the rebuilding of the Fleet is now essential.

THE ROYAL AIR FORCE TECHNICAL COLLEGE

BY WING COMMANDER H. R. P. PATTERSON, O.B.E., M.A.

AIR MINISTRY Order A289 of 12th November, 1953, deals with the organization of the Technical Branch of the Royal Air Force, and it is therein stated "The Technical Branch is responsible for the policy and co-ordination of the professional training of its own officers. . . ."

Most of that training is carried out at the Royal Air Force Technical College, and currently there are about thirty different courses for Royal Air Force technical officers and technical cadets, each having its own particular aim and purpose. Earlier training policies and programmes are gradually fading out whilst new schemes are being introduced, and it is reasonable to suppose that when this period of transition has passed the training task will become more streamlined.

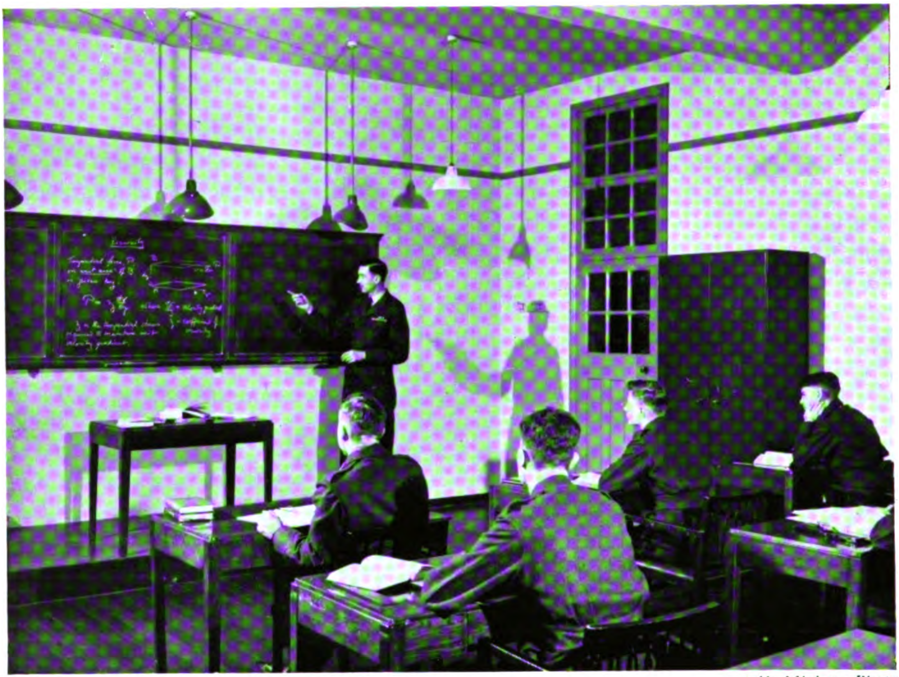
According to modern ideas a technical officer should first receive a sound basic professional training upon which is then built either a mechanical or an electrical structure. Within these twin structures there must be, as a rule, degrees of specialization, sometimes to the extent of post-graduate training, to qualify selected officers for advanced specialist posts. Equally so there must be some integration of mechanical and electrical knowledge, not only for the reason that the higher rank requires the broader view, but because modern technology progresses by an integration of knowledge. Indeed, no better example of this point need be quoted than the study of guided weapons, which calls for the dovetailing of a major content of the three traditional specializations—Engineering, Armament and Signals.

The special preparation for technical staff and administrative posts is included in the Air Ministry training policy; and for the officer whose immediate employment is in the field, familiarization with the equipment for which he will presently be responsible is also covered.

The technical cadet scheme indicates the pattern of present policy. First, the year at Henlow to consolidate basic theory and for the embodiment of the counterpart of the O.C.T.U.; then the second phase, two years on applied subjects at the College or three years at a university, during which time the mechanical-electric bifurcation takes place. Following this phase, or currently with it, the cadet is acquainted with the type of equipment with which he is likely to be concerned in the early part of his career, and the rules and regulations for servicing it.

At various stages in his Service career the ex-student may require further training—continuation, refresher or specialization: the range and complexity of equipment for which the technical officer is responsible is so great and develops so quickly that occasionally he must have time and opportunity to catch up on new principles and current trends.

By way of introduction something must be said of the history of the College. The training of engineer officers began at Henlow soon after the First World War and has continued there ever since. The other specializations have had various homes; latterly armament officers were trained at Manby, and signals officers at Debden. As it is the policy gradually to abolish the barriers of these



[Air Ministry Photo

IN THE CLASSROOM

[Air Ministry Photo

THE CADETS' MESS

specializations, it is natural to integrate and centralize all technical training. The College as such was formed at Henlow in 1949, armament training being transferred there in November, 1950 (including, as it now does, an important guided weapons section), and the signals division continues—for the time being—to occupy Debden. The Commandant and his headquarters staff are at Henlow. The scope of this article cannot, for reasons of space, include Debden, and the activities of that virile station must be written as a sequel at some future date.

The College at Henlow is geographically and historically in two areas. The older site embraces the basic workshops, the engines laboratories, combustion and test cells, the air compressors, wind tunnels and similar bulky (and often noisy) installations. Like the engine room of a ship, it tends to remain very much a conservative entity and regards the rest of the outfit with some degree of irreverence.

The new area was formerly the domestic part of the camp (Henlow is always called "The Camp" by the local people, and the British Railways' station is officially "Henlow Camp"). Most of the permanent buildings have now been converted into very satisfactory classrooms, laboratories, an assembly hall and headquarters accommodation. Conversation in this area tends, on the whole, to centre more on vector analysis than on universal grinders.

The general amenities of the College include two Officers' Messes, the Cadets' Mess, excellent playing fields (the cricket pitch is said to be the best in the Royal Air Force), a theatre, a cinema, a grass airfield and perhaps rather more than the usual number of offices. St. Andrew's Church is not only a fine architectural asset; it and St. Martin's Church and St. Michael's Catholic Church are important elements in the life of the community. Within the last year the Chaplain-in-Chief, the Assistant Chaplain-in-Chief, the Bishop of St. Albans, the Dean of St. Paul's, supporting our resident Padres, have preached at Henlow.

The technical organization of the College falls into four main Wings: Basic Studies, Aeronautical Engineering, Armament and Electrical. Basic studies provides for mathematics, physics, humanistics, etc.; aeronautical engineering embraces applied aerodynamics and thermodynamics, materials, airframes and structures, and workshops; armament covers guided weapons as well as the more conventional missiles. The Electrical Wing has departments concerned with electrical power and machines, electronics, signals and communication equipment.

Thus the requirements of all courses can be met by calling upon the resources of the various departments.

It would be tedious to attempt a precise analysis of the various courses and the manner of their instruction. It is sufficient to note at this stage the wide differences. The technical cadets (H)* spend three years of corporate life at the College in their most formative years. In contrast, the average age of recent senior specialist entries is thirty-four years. Most of these officers are married and live out of Mess. Some courses are highly academic: others are equally biased on the practical side.

Instead of pursuing particular aspects the reader will be taken on a tour of the College, where he will see people and things which may present the picture in broad perspective.

Probably the oldest and best-known elements of the College at Henlow are the basic workshops, and we may well start at this point. Here we have forge and foundry, welding, pattern making, sheet-metal working and two excellent

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* (H) denotes the cadet who completes his technical training at Henlow. (U) denotes the cadet who studies for the first year at Henlow and then goes to a university for three years.

[Air Ministry Photo

INSTRUCTION IN WELDING

machine shops. The equipment is sufficient in quality and in quantity to give the equivalent of a first-class apprenticeship. The forge and the drop-hammer are, as it were, founder-members, for they were here in the early 1920's. Indeed, the Royal Air Force Technical College is becoming known as "The Forge" (as Woolwich was known as "The Shop"). Not an inept name since it suggests shaping, forming and tempering the raw material.

In the welding shop you notice a group of officers being instructed in a particular technique of electric welding. They are in overalls, so one can only guess their nationalities. Actually they come from Pakistan, Norway, Burma, Syria and Iraq. Their course lasts about twelve months. Most, but not all of them, live in the College Mess.

The College is in process of continual development, and the plans made to meet aeronautical progress necessarily involve a number of long-term projects. To illustrate the point let us look first into the Structures Laboratory and then into the Airframes and Aerodynamics Buildings.

In the first a syndicate of students is making an experiment concerned with the vibration (and hence the fatigue) of an aircraft structure under various dispositions of loads. The students are cadets (H). They have been at Henlow for about eighteen months and have acquired a sound academic background, poise, discipline and a healthy complexion: most of them have done a number of hours on Tiger Moths and Chipmunks.

Their successors in this laboratory will be able to carry out further up-to-date experiments, such as vibration work on turbine and compressor blades.

The Airframes Section covers an enormous field. For example, the safety devices and clothing for high-altitude flight is the responsibility of the present-day technical officer, and some instruction must be given in decompression chambers simulating high altitudes.

Officers of the General Duties Branch are, of course, familiar with the operational use of normal flying equipment, and the class to whom the ejection seat is being demonstrated includes some officers transferred from that branch. Nevertheless, they too have to learn the technical principles involved and the problems of the future.

In the Aerodynamics Block a class of adult officers on a senior specialist course (engineering) are revising their knowledge of lift and drag coefficients, using a wind-tunnel made at Henlow nearly thirty years ago. In a year's time students may be able to experiment with models subject to a Mach number of two. They will also be able to use a "water analogue," which demonstrates three-dimensional flow. In passing, it may be said that these adult officers are by no means so adult as to have reached the bowls and billiards level of athletics. Henlow has always been able to produce a good cricket team and a stalwart rugby side, of which student officers from this and similar courses are often the backbone. And it is equally true that the technical cadets have kept up the reputation of the College, for there is no major sport in which they have failed to make their mark. Even in the holidays they have needed little encouragement to display enterprise and initiative. Indeed one cadet who found his way to Malta immediately signalled back for a month's pay in advance.

Before going to the new part of the College we should see what is developing in the Propulsion Department. The elementary work comprises laboratory experiments on engines such as the Ricardo, Ruston-Hornsby, etc., and on superchargers. Then comes combustion, e.g., actual thermodynamic tests on a single gas-turbine combustion chamber, and demonstrations with a small ram-jet, followed by experimental and production tests on aero gas-turbines. Parallel with these phases is the practical work on repair and maintenance of current-type engines.

The small group of officers who are gathered round the sectioned Avon gas-turbine engine are from a "direct entry" course. That is to say they are mainly graduates in engineering from various universities and they are learning about the equipment with which they will soon be concerned in their first jobs in the Royal Air Force They also have instruction on technical organization and administration, so that they may know something of Service procedure when they arrive at their units.

The modern College buildings are still known by serial numbers, e.g., Block 37. One day they may have more romantic names—there is no lack of suggestions. What was formerly the N.A.A.F.I. block is now the A.O.C. and Commandant's Headquarters, the Library and the Hall of Assembly. A staff common room and a large lecture room and cinema are included. Similar conversions have been carried out on a number of standard three-storey blocks, yielding a range of very satisfactory laboratories and classrooms.

We might look into the Guided Weapons Building. Most of the doors are locked and the windows barred, but we can at least see some of the students at work in a laboratory.

This flight lieutenant whom you see delving into a mass of apparatus has already passed the advanced armament course (a two-year course of University level) and is now completing his thesis and task at the termination of another twelve months on guided weapons. He always shows visitors his complexity of servo-mechanisms with grace and enthusiasm. . . . "The rate controlled gyro is sensitive to roll, bowl or pitch and passes a dirty look to the disconcerting circuit through a semi-conscious A.G. Diode with the result that the 3-D amplifier becomes self-conscious and that pump that makes a hell of a noise waggles the elevons and things on the tail."

Selected students from the twelve months' guided weapons course go to research and development posts at R.A.E., R.R.E., and elsewhere, or to similar work at selected firms.

Laboratories in the Basic Studies Wing—Physics, Electricity, Chemistry—are conventional, though of high standard, and the Materials Section is particularly well equipped. Here in one room is the Metallurgy Laboratory with a separate microscope compartment, and in the other room a full range of testing machines. Plastics, synthetic and composite materials are coming much to the fore, and considerable space has been allotted to illustrate new techniques and to test specimens.

A cadet (U) is learning to use a polariscope for stress analysis. He is at Henlow for only one year and is going on to Cambridge to take an Honours Degree. These young men enter Henlow direct from school at the age of about 17½ years, and in the following March take the Cambridge Mechanical Science Qualifying Examination. About twenty cadets entered universities — mainly Cambridge — in this way in the autumn of 1953.

We might have a few words with Cadet Brightray; he is from Helstead.

"What's this apparatus you are playing with?"

"It's not really in my syllabus, sir, but we have been doing polarized light in physics, and this instrument makes practical use of the principle to show stresses in complex specimens. I thought I would like to know how to operate it."

"Good. I expect they keep you busy at Henlow?"

"We had to keep *ourselves* busy, sir, to get up to scratch for the M.S.Q.E. exam. Now that's over we have to catch up on some of the things we missed earlier, like G.S.T.—square-bashing to you, sir."

"What do you do in your spare time?"

"Spare time, sir? You mean apart from studies, flying, parades, drill, games, eating and sleeping? Well, of course, there is the Debating Society, special lectures, repairs to the motor-bike, writing home to my family and . . . Sorry, sir, would you excuse me? I have to rush off. The C.O. wants to see us all at 1600 hours. Perhaps you would like to get an idea of our activities from the College Calendar. I have a copy here. Good-bye, sir."

The College Calendar is, in fact, quite a revealing document, and a typical extract from it may be of interest:

Mon. 12. 1030 hrs., Lecture, "Communism," by the Very Reverend the Dean of St. Paul's. Building 62.
1930 hrs., Royal Aeronautical Society, Henlow Branch, Annual Presidential Address, "Air Logistics," by Air Chief Marshal Sir John Whitworth Jones, K.C.B., C.B.E., Air Member for Supply and Organization.

Tues. 13. 1930 hrs. for 2000 hrs., Guest Night, Cadets' Mess.
1700 hrs., Lecture, "Some Problems of High Speed Flight," by Air Commodore G. Silyn-Roberts, C.B.E., A.F.C., M.Sc., F.R.Ae.S., Director of Military Aircraft Research and Development, Ministry of Supply. Building 62.

Wed. 14. 1430 hrs., Rugby, R.A.F. Henlow *v.* Jesus College (A).
1430 hrs., Hockey, R.A.F. Debden *v.* R.A.F. Waterbeach (H).
Hockey, R.A.F. Henlow *v.* R.A.F. Halton (H).
Soccer, R.A.F. *v.* F.A. XI. White Hart Lane.
Soccer, 1st Round R.A.F. London League Cup, R.A.F. Henlow *v.* R.A.F. Ely (H).

To sum up this superficial description of the Royal Air Force Technical College is no easier than to write it. The College is in a sense a new venture with

[*Air Ministry Photo*

A COLLEGE FOUR ON THE RIVER AT BEDFORD

old traditions. The fundamental motives remain whilst the horizon of technical attainment continually advances. The advent of the adolescent student has complicated but greatly stimulated the training effort. The rate of development since the College received its charter has been too great for accurate measurements of its success to be revealed, but at least there are favourable indications. The Technical Cadet Scheme has been launched successfully; the integration of knowledge and the bearing of one specialization upon another seems better understood; syllabi become more realistic without the loss of solid theory.

Perhaps the memory of a Guest Night in the College Mess might provide the thought on which to conclude this article. The formal toast has been drunk; the lights have been fused and re-illuminated; the officer from Greece has mounted the table and made his witty farewell on behalf of his course ("I would like to speak to you in my own language but it would be all Greek to you"), and, of course, the Chief Guest has made his usual brilliant after-dinner speech. The essence of his words remain in our minds:

"From what I have seen, your College is being run on sensible lines. You are producing neither boffins nor mechanics, but reasonable chaps who, in the words of Sir Sidney Camm, have a knowledge of the natural laws and an appreciation of their practical application. Your Commandant has the surveillance of Technical Cadets at the Universities, and wherever a student is posted this is always his Alma Mater. It is evident that the College is a unique and essential element in the make-up of the Technical Branch of the Royal Air Force."

NOTICE

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Books and lectures have always been an essential need in the career of an officer, and in the provision of these the Royal United Service Institution has played a prominent part since its foundation in 1831.

The Institution's library contains the finest collection of military literature, in the broadest sense, in this and probably any other country. Books by all the best-known writers and by specialists on every aspect of Imperial Defence and the conduct of war range from the latest publications to many rare old editions long since out of print. The majority of these are in the lending section of the library from which members can borrow four volumes at a time, by post or personal collection. Adjacent to the library is a comfortable reading and writing room for work on books in the reference section.

The lecture theatre is a recognized forum where subjects of the highest interest to the Services are expounded by the best professional authorities and where officers can take part in open discussion. Occasional lectures are of wide public interest, and members may introduce friends, including ladies, to meetings.

The Journal of the Institution is published quarterly and is recognized in all countries as the leading publication of its kind. It is sent free to all members and is the medium whereby lectures and discussions reach messes, libraries and other institutions all over the world. It also contains authoritative articles on professional subjects, and sections devoted to international affairs, Service notes, book reviews, correspondence and the latest additions to the library.

Among other facilities offered to members and their friends are free admission to the museum in the Banqueting House of Old Whitehall Palace and opportunities to view State processions passing down Whitehall.

Although the cost of the Journal is £2 a year to non-members and admission to the Museum is 2s., commissioned officers, past and present, have the full privileges detailed above for an annual membership subscription of 30s., or a life subscription of £24.

Further particulars and membership forms will be supplied on application to: The Secretary, Royal United Service Institution, Whitehall, S.W.1 (WHI. 5854).

Editor's Note.—This notice is published at the request of the R.U.S.I.

THE YUGOSLAV AIR FORCE

By Colonel Ilïja Zelenika, Y.A.F.

FOR a better understanding and appraisal of the Yugoslav Air Force (Y.A.F.) it is necessary to give a short survey of its historical development. A small minority of readers might be acquainted with the fact that aircraft were first used in our country as early as 1913 in the siege of Scutari during the Second Balkan War, when the first Serbian military pilot, Sergeant Petrovic, perished on active service.

Some units of the Serbian Air Force took part in the First World War and were especially successful during operations on the Salonika Front, its break-through and during the liberation of the country.

Between the two world wars the Y.A.F., like the air forces in many other countries, went through several crises because of the lack of understanding of modern warfare on the part of the military leadership.

Depending on political developments, the Y.A.F. of that period was supplied in turn with French, British, Czechoslovak and German *matériel*. At that time in our country there was a small but comparatively modern aviation industry which, besides producing some home-designed aircraft, also built under licence the French aircraft Bréguet XIX, the British Hawker Fury and Blenheim, and the German Dornier Do-17. Consequently the Air Force was in actual fact a conglomerate of the then contemporary European aircraft production, which constituted a major difficulty for its efficient use, apart from the fact that the Y.A.F. was as a whole numerically weak and had an obsolete system of command.

In 1941 the Y.A.F. suffered the same fate as the air forces of the majority of other countries and became victims of unexpected German aggression. Without any declaration of war the German Fascists simultaneously attacked the majority of air bases and other military and civilian objects. The aircraft were partly destroyed on the ground and partly in air combats with the more powerful opponent, and only an insignificant portion managed, before the capitulation of the former Yugoslav Army in April, 1941, to escape and join the Allies, where for a certain time some of the units continued to carry out combat missions. But, on the whole, the capitulation of the former Yugoslav Army meant at the same time the end of the Air Force too.

About the middle of 1941 a general people's uprising broke out in Yugoslavia and developed later into a powerful National Liberation Movement. The new National Liberation Army of Yugoslavia was created under such conditions. Because of its specific way of fighting, this army could not in the first years develop—at least not to a large extent—technical branches, and especially the Air Force. The participation of individual aircraft in the operations of the National Liberation Army was always of short duration because of lack of supplies.

The first air base of the National Liberation Army was established in 1943. From this base, with the help of the Allies, two squadrons (one of Spitfires and the other of Hurricanes) were formed in North Africa. These two squadrons, which at first formed part of the Balkan Air Force, supported the units of the Fourth Army in the final operations for the liberation of Dalmatia, Istria and Trieste. At the end of 1944, with the help of the Soviet Air Force, two air divisions (a fighter and an assault division) were formed from airmen within the ranks of the National Liberation Army, which supported the First, Second and Third Armies in their final operations for the liberation of the northern part of Yugoslavia. Thus, already during the war, a strong nucleus was created, capable of promoting further the development of the Y.A.F.

At the very beginning of the Fascist attack against Yugoslavia and later throughout the war the German and Italian aircraft inflicted great losses upon the units of the National Liberation Army and the unprotected civilian population on liberated territory, who had no means or possibility of opposing them successfully. Therefore, in the post-war organization of the armed forces of the F.P.R.Y. great attention has been paid to the Air Force, even more so as the Air Force was, for quite comprehensible reasons, one of the less developed arms at the end of the war.

It is often recommended that small countries should rely, when solving their various and intricate Air Force problems, upon larger and more developed countries. This is undoubtedly an easier way and, at first sight, a cheaper one, too. In the first years of our post-war development we were compelled to choose that road, but at the same time we embarked also upon the second road—which is more strenuous, but has more perspective—with a view to freeing ourselves, as soon and as much as possible, from dependence upon foreign countries. Concurrently with the training of professional personnel and the purchase of flying and other *matériel* abroad, we opened the necessary training schools in our country and reconstructed our devastated factories, built new ones and entrusted civilian constructors with the task of providing the most needed types of aircraft and equipment, first of all training aircraft, and later combat aircraft also. We have reconstructed almost all the old airfields and begun the building of new ones. At the beginning of the post-war years we laid the foundations of the scientific establishments of the Air Force—Technical Air Force Institute, Institute of Aviation Medecine, Aviation Department of the Higher Technical School, etc.

It will be clear to every reader that the period of eight years which has elapsed since the end of the last world war is a relatively short one even for a developed country with a powerful industry, and even more so for Yugoslavia which began to develop its Air Force under very difficult conditions and whose young aviation industry began to emerge from ruins only in 1946. However, thanks to a correct assessment of the role of the air force in a modern army, and the great enthusiasm with which the people of the liberated fatherland applied themselves to the task, solid foundations for the thorough development of the Yugoslav Air Force have been created during this short period of time.

ORGANIZATIONAL STRUCTURE OF THE Y.A.F.

The organizational structure of the Yugoslav Air Force is in harmony with the general structure of the armed forces. The Air Force has been a special branch within the armed forces from the very outset, with the basic task of defending the territory and supporting the Army and Navy. In studying its needs and possibilities every country adjusts the organizational structure of its armed forces, including the air force, to its specific conditions. Certain elements of the air force organization can be transplanted in a more or less modified form from one air force to another. However, there is no doubt that in most cases one cannot transplant the whole organization of an air force to another country, especially if it is the case of air forces of countries with completely different geographic-strategic and geographic-climatic conditions. Having all this in view, the most advantageous organization has been chosen for the Y.A.F. It goes without saying that the present one is not final and that it will have to be further adapted to new conditions, which are, during the continuous development of the Air Force, most conspicuous in the technical field.

The basic unit in the Y.A.F. is the squadron. Squadrons are grouped, in groups of three, into air regiments, the latter into air divisions, and the air divisions into air corps. In certain branches of the Air Force, such as reconnaissance, transport and liaison, it is not necessary to have larger formations than the air regiment. Maintenance and technical units are organizationally separated from flying units, which enables the latter to have a better manœuvring ability. The highest commanding organ is the Command of the Y.A.F.

THE PROBLEM OF REPLACEMENT

As it has been stated earlier, the Y.A.F. had at its disposal at the end of the Second World War a certain number of units whose flying personnel had considerable war experience. However, it has to be stressed that all the members of these units had, before joining the Air Force, gone through the rough war experience of the struggle for national liberation, and all these men had on innumerable occasions shown their high military qualities in heavy fighting against the invaders. With the improvement of their professional skill the Y.A.F. found in these cadres a battle-tried nucleus of high morale which has stamped the whole Y.A.F. in its further development with a strong fighting spirit. During the war and immediately afterwards, a relatively small number of professional personnel were trained abroad, most of the personnel, both flying and technical, having been trained in Yugoslavia.

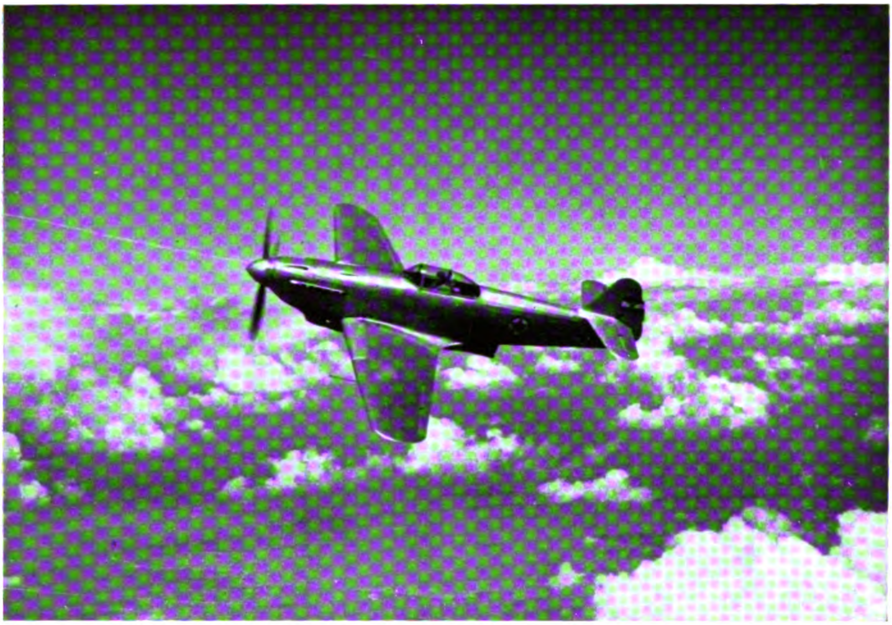
Today the flying personnel is being trained in several schools of the Flying Training Centre. The training of flying officers lasts three years. During this training they have to attain two aims: the young men entering the Training Centre after eight years of secondary school in order to become officers must first acquire a solid and basic military knowledge; and, secondly, acquire the profession of military pilot. The training of pilots begins on basic training aircraft, is continued on an advanced trainer, and ends with single-engine combat aircraft. Retraining for multi-engine and jet aircraft is done at special courses. In future the whole training will be done in the Flying Training Centre—including combat training on jet planes. The number of flying hours per pilot in the Pilot School amounts to 220 to 240.

The further training of subaltern commanding personnel takes place in the Air Force Application School, while the highest qualifications in the Air Force are acquired at the Higher Air Force Academy. Almost every flier attends several shorter professional courses in the course of his career.

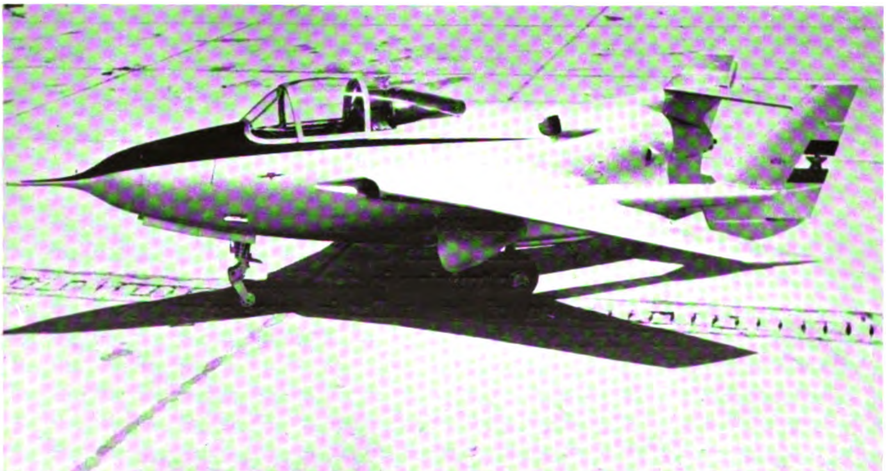
Technical non-commissioned officers are trained in several professional technical schools, while technical officers are trained in the Air Force Technical Academy, and later perfect their training in the Higher Air Force Technical Officers' School. The duration of the studies in these schools is varied—in accordance with the purpose of the school and the volume of the material to be learned. Studies last up to three years.

It is characteristic of all our schools that they do not merely aim to provide the students, at all levels of study, with a narrow specialized education, but at making every graduate student acquire a sound general education in addition to the required speciality.

There is no difficulty in recruiting a sufficient number of candidates, because the Air Force is very popular among the youth of Yugoslavia. The only difficulty perhaps is that there are too many candidates to choose from. The organization Aeronautical Association of Yugoslavia has done very much to



Fighter aircraft S-49C with a Hispano Suiza 12*z*-17 *engine of* 1,200 *h.p., span* 10.3 *m., length* 9.062 *m., total weight* 3,468 *kg., maximum speed in level flight* 628 *km.*



452 *Experimental twin-engine aircraft* "452", *Turbomeca* "*Palas*" *engines with a* 100 *kg. thrust, span* 5.25 *m., length* 5.97 *m., total weight* 1,060 *kg., maximum speed in level flight* 780 *km.*

popularize the Air Force. Through the aero clubs, of which there are more than 170, it trains young men in aero-modelling, gliding, parachute-jumping and piloting. In every larger town in Yugoslavia they are engaged in various branches of aviation activities as members of these aviation clubs.

Training aircraft Aero-2 with a Walter-Minor 6/111 *engine of* 160 *h.p., span* 19.5*m., length* 8.23*m., total weight* 978 *kg., maximum speed in level flight* 224 *km.*

One of the most essential elements for every air force—i.e., to train cadres possessing a high morale and good military and professional knowledge—has been most successfully solved in the Y.A.F., which ensures, together with a corresponding material basis, the high quality of this branch of the armed forces.

MATÉRIEL

In this part I am going to deal briefly with the flying *matériel*. In the first post-war years the schools and units used mainly Soviet *matériel*. Immediately after the war, however, we started to construct our own prototypes of training aircraft, and a few years later equipped our training centres with aircraft of domestic construction and make. The aircraft Aero-2 (designers, Cijan and Petkovic) has been adopted as a beginning type, and the aircraft 213 (designers, Sostaric and Dabinovic) as an advanced trainer, so that basic instruction in our schools is performed exclusively with domestic *matériel*. The flying qualities of these aircraft fully correspond to similar categories of aircraft used abroad. In 1950 the first series of the single-engine fighters S-49A (designers, Sivcev, Zrnic and Petkovic) was introduced into the units. The first series of this aircraft had a mixed structure, but the second series is an all-metal structure (marking of the aircraft, S-49C). This aircraft is *not* a copy of Y.A.K.-9, as was stated in certain foreign newspapers. In 1941, in the battle over Belgrade, the predecessors of this aircraft (by the same designers), with a less powerful engine and thus limited performance, successfully fought the German aircraft of those days. At that time Y.A.K.-9 did not even exist.

In addition to these types of aircraft the training aircraft Trojka (designer, Cijan), which is destined for training in aero clubs, is being mass produced. Furthermore, several successful prototypes were constructed. Two of these—a two-engine light transport aircraft and the advanced trainer 214 (designer, Professor Milutinovic)—have been selected for mass production, while others are at the experimental stage. The series of experimental aircraft of small dimensions (designer, Beslin) is interesting. In two of these aircraft the pilot has a prone position. With the aid of these aircraft very interesting research was made regarding the G-pull of the pilot, under conditions of sudden changes in the régime of flight (pull-out, etc.), in the course of which the overburden of 10-G was overcome. The same constructor built an experimental aircraft of small dimensions, 451-M and 452 with two Palas jet engines. Very interesting

215 *Prototype of advanced twin-engine trainer* "215" *with a Ranger SVG-*770*-C-*1*B engine of* 450 *h.p., span* 16.14*m., length* 13.35*m., weight* 4,571 *kg., maximum speed* 384 *km.*

results have been obtained with these aircraft. Further, we have to refer to the construction of the two-engine training aircraft 215 (designer, Professor Stankov), training aircraft 212 (designers, Zrnic and Popovic), tourist aircraft 1 Maj (designers, Zotovic and Bogojevic), Sostaric's transport glider, and a number of very successful types of training gliders.

It is important to emphasize that all these aircraft are supplied with instruments and other equipment produced by our own industries, and the aircraft Aero-2 is equipped with a home-made engine (VM-6/III of 160 h.p.). In order to appraise all these results correctly we must bear in mind that the Yugoslav aircraft industry did not function throughout the war, that it was plundered by the invaders and completely destroyed during their retreat, that constructors and other experts (many of whom were imprisoned in Fascist camps) were completely inactive at a time when certain countries carried on most intensive activities, that a large part of professional cadres, which were never numerous, disappeared during the war, and that everything had to be started anew after the end of the war. Owing to the rapid development of aircraft construction, it is not easy to make up for lost time and to catch up with countries with developed aircraft industries. In solving this task it is important to choose the most suitable and most rapid road. We hope to find it.

The building up of an air force constitutes for every country a great effort and entails large material expenses. However, when our national security was in question, our peoples made great sacrifices, and they are equally willing to do so today. The military assistance we are receiving from the Allies greatly facilitates our efforts to build quickly a powerful Air Force which will, together with the other branches of the armed forces of the F.P.R.Y., represent a solid bulwark against aggression in this part of the world. In the course of the past year many units were re-equipped with modern *matériel*. In addition to Mosquito VI and 38, Thunderbolt F-47 and S-49C, some units have also been retrained with Thunderjet F-84G aircraft. In the course of the next few years the flying and other *matériel* is to be modernized to an even larger extent. At the same time many bases and other installations are also being modernized. Although we are still faced with many problems which will necessitate great material sacrifices, we may freely say that, from the organizational point of view, the Y.A.F. rests today on a firm foundation, that it has at its disposal a well-trained flying and technical personnel, possessing high moral qualifications, and that it is on the right road to solve satisfactorily the problem of the necessary material basis.

WAR AND THE TECHNICIAN

BY WING COMMANDER E. J. TIPPETT, B.SC., PH.D.

WHICH WAR?

MOST of the time and effort of the Services in peace are devoted to preparing to meet attack from a potential enemy; the peace-time Royal Air Force is, therefore, essentially a vast and complex training machine. Unfortunately it has to work under the greatest difficulty because, for one thing, its objectives are necessarily somewhat obscure. Is the war for which it is preparing imminent or will it be delayed for some years? No one knows, but assumptions must be made on this question if training policy is to be shaped correctly. The present trend of popular thought seems to be that war is not imminent, but it is doubtful if our Service chiefs could take the risk of basing their training policy entirely on that assumption. Therefore, to some extent at any rate, two wars must be assumed; one now or soon; "this year, next year"; and another in the distant future; "some time, never"; and both of these wars cannot be prepared for in the same way.

Although the training problem is of necessity of the greatest complexity, a broad simplification can be adopted in its consideration by assuming it to have two main aspects; the training of the flyers and the training of the men who keep the aircraft and its equipment in working order. The problem of training the flyers, as it appears to one of the earthbound, is mainly one of finding men of the right spirit and character and of developing these attributes, while the training of those who keep the flyers airborne involves the imparting of technical skill and basic knowledge. Thus, the two problems are fundamentally different and are not amenable to the same treatment. The purpose of this article is to examine the second problem and to consider principles for its possible solution.

How can the technical tradesmen of the Services, the mechanics and fitters of the Royal Air Force, be prepared for the two postulated wars? Essentially, the task of these tradesmen is to keep the aircraft and its equipment in working order, and their training must prepare them for this task. It is often hotly debated as to whether it is preferable to teach airmen to do these jobs by rule of thumb or to concentrate on giving them a sound knowledge of the basic scientific principles underlining their trades, so that they may do their work by reasoning and with intelligence. Whatever the opinions of training officers on the practicability of one or the other course, most will probably agree that, other things being equal, the man with the fundamental understanding of the basic principles of his trade is the more useful. But other things seldom are equal; sound basic training takes longer to impart than superficial technical skill, so the choice is usually Hobson's. Time is ever the stumbling block in all Service schemes; there is always the dilemma that sound educational methods preclude the hasty cramming of knowledge into short courses, but the Service cannot afford to train its tradesmen in the leisurely fashion dictated by respectable educational precepts. However, by further over-simplification, perhaps it can be shown that one principle might be adopted in preparing for the imminent war and another in getting ready for the more distant one.

TRAINING BY RULE OF THUMB

If a war is imminent it can be assumed that it will be fought, initially at any rate, with weapons and equipment already in service, or with very similar devices. This simplifies the problem of training technicians enormously, since it is known exactly what they are being trained for; i.e. to keep existing aircraft and equipment in working order. How best can men be trained for such a limited task in a short time? Surely, by actually doing the job which they are required to learn; but since it is usually impracticable to learn by doing on any large scale, on squadrons where day-to-day flying or ground routine is in progress, most of the training must be done at Royal Air Force schools, as at present. At these schools, let it be assumed, then, that the sole aim of training this class of tradesman is to fit him to keep existing equipment working; let him be taught this, and nothing else, as his essential trade training. Let there be no attempt to cram basic theoretical knowledge into his mind hurriedly, in the hope that it may form the basis of subsequent practical training, but let all he knows of his trade be culled from the actual use of his hands. This is doubtless already done in some trades but there are certainly others where it is not done. In this way, mechanics could learn the routine jobs of their trades very quickly, and much of the normal work of a fitter might also be absorbed in the same way.

Such training would produce men of skill, but is this enough? Nearly, but not quite. It suffices to enable the tradesman to ply his trade, but it allows and even encourages him to lay his brain to rest. That must be avoided, because a Royal Air Force technician must be alert as well as skilful, as so many lives and projects depend upon him. It is necessary, therefore, that his trade training should be supplemented by mental training, i.e., education. Let this supplement take the form of a continuous educational course in which he is taught the elementary science underlying his trade, at a slow tempo, and as a subject of interest rather than one which helps to qualify him as a tradesman. There may be little immediate dividend from such education, but dividends are likely to accrue as the airman gains experience in his trade and finds that he can use his brain as well as his hands in doing his job.

In preparation for imminent war, then, the training of the tradesman is to be severely practical. Of course, men trained in such a fashion would not meet all the needs of a force fighting with current weapons, but the hard core of the maintenance could be done by them. The training of smaller numbers of others for more specialized tasks is a secondary problem, which is not examined in this article, since the postulation of broad principles is aimed at, rather than the elaboration of details. The principle enunciated above is not new, of course; it is applied on a large scale in civil life, but its adoption in the Service has so far been only half-hearted, possibly because considerations of the likely calls on tradesmen in a distant war have clouded the issues at stake in an imminent war. There is a need for more single-mindedness in working out these problems.

THE FUNDAMENTAL APPROACH

So much for getting ready for the war "this year, next year." Now for the "some time, never" war. How is the technician to be trained to meet such a distant crisis? The essential task in this case is to build up a huge reserve of tradesmen who can be called on, with little warning, to keep the Air Force in the air at some future date when hostilities break out. The men trained for the imminent war along the lines described above would be virtually useless for this, as the equipment they had learned on and grown up with would be obsolete, and they would lack the grasp of fundamentals which might enable them to master new devices without long training. In preparing to meet such a situation the Service will obviously have to look largely to the National Service airman, but it is extremely doubtful if the training which it is possible to give him under existing conditions can fit him for his future task. Under present training schemes he imbibes hastily a smattering of basic science, supplements that with the acquisition of some skill of hand and scarcely consolidates this with practical experience, before he returns to civil life. Inevitably, he quickly forgets most of what he learned during his hasty courses and short service; and what can a brief annual visit for reserve training do to keep alive that which has never properly taken root? The R.A.F. can scarcely look with confidence to a distant war, if such men are to form the ranks of its technicians.

Surely, the one essential thing in preparing a potential tradesman for a distant war is to give him a firm understanding of the scientific principles underlying his trade, so that he may be able to apply those principles intelligently to whatever equipment may be in use at the time when war breaks out. The essential thing is thus something which it is impossible to give an airman during an over-all period of service as short as two years—or possibly even less, if some political views gain sway. No man can gain a thorough grasp of fundamentals in a hurry; he can only do this by taking knowledge in small digestible doses, with intervals for assimilation, during which his knowledge can settle down and be sorted out. His training must be leisurely, if it is to result in lasting knowledge, and to attempt to compress that which should be spread over years, into weeks, is to invite disaster and squander effort. Here is a dilemma; but once again, the National Service Act itself suggests a way out.

NATIONAL SERVICE IN MUFTI

Each year a number of suitable National Service men could be excused the normal form of military service entirely and, instead, be required to attend a technical school or college, as civilians but under the ægis of the Royal Air Force, for one or two days per week, over a period of years. During these school attendances the selected men would follow an academic course of study, designed to give them mastery of the basic science underlying certain Royal Air Force trades, at the levels necessary to fit them to undertake practical work on new and unfamiliar equipment, at short notice and with the minimum of training. The spreading of the technical education of these men over years, and the resultant leisurely pace, would ensure that basic principles could be firmly implanted in their minds, and the country could rest secure in the faith that there was being built up a body of men who would find no difficulty in applying principles to techniques in a future emergency.

Experience has shown that these principles are sound, for were not the first ranks of radar tradesmen in the last war filled by men who had received just such courses of training in pursuit of their normal civilian occupations? And were they not able to step into the breach with very little technical training and keep the essential radar services going through the critical first months of the war? These were the men of the Radio Register, who were called up immediately the war started, and entered on their new tasks with such enthusiasm. They succeeded because basic principles, implanted in their minds over the years, provided a firm foundation for technical training. When this source of technician had dried up, a scheme having some similarity to the one outlined here was adopted with the greatest success. Selected airmen were sent to technical schools and colleges for *ab initio* courses in radio science. These courses were necessarily hurried, as the emergency demanded speed, but the practicability of the type of scheme was established. This principle, proved by experience, can be adapted to present needs to prevent the wasting of time and resources in training schemes which cannot help us to face the future with confidence.

It may be objected that technical schools and colleges are already fully occupied, but this is believed to be not true of the day time. Many such establishments are hives of industry in the evenings, but are under-occupied between nine and five. A scheme of this nature, therefore, would enable the resources of the technical schools and colleges to be used more efficiently. Further, if necessary, supplementary schools might be opened in Service premises and run by Service staff, as long as the general principles of the training were not departed from. The objection that the scheme could only be applied to men living near large towns is valid but scarcely relevant, because there are already all sorts of anomalies in the application of the National Service Act, viz., deferment for University courses, deferment for apprenticeships, etc. Why should there not be yet one more anomaly, if it is in the interests of economy and efficiency, particularly as such a scheme should not only produce better tradesmen for a future Royal Air Force, but also better civilian tradesmen in the meantime?

A system of this nature would fail to make airmen out of these reserves; the latter would not know how to "get fell in," how to march, how to salute, how to clean their bed space, how to shoot and crawl on their bellies, how to tremble at the bark of the Warrant Officer. But these "know how's" are not so difficult to acquire; they could be knocked into the heads of intelligent men during a very few weeks of recruit training on call-up in the emergency. In any case, the continuous academic training would probably be supplemented by annual service for a week or two with the actual Royal Air Force to see something of the technical Royal Air Force at work. The men could be introduced to these other mysteries of Service life during such short periods of service. No doubt numerous other objections can be advanced, but are any of them overriding in the face of the necessity to make some bold attempt at meeting a situation which less ruthless compromise measures fail to deal with? The problem has become so involved as to be unmanageable in all its complexity; a solution must be sought, therefore, by looking to essentials and by not tackling too much at a time.

RE-CAP.

To summarize: the problem of training technicians to keep the Air Force flying during war has two main aspects. The solution to this problem depends on whether the war is to be fought soon with current weapons and equipment, or in the distant future with devices as yet unknown; and no one solution is adequate to meet both sets of circumstances. To prepare for the imminent war the most expedient method of training is the severely practical one, i.e., to teach by rule of thumb, without attempting the impossible task of trying to base technical training on fundamental principles which have to be taught too quickly for them to be assimilated. For the distant war, however, mere skill of hand on equipment which will then be obsolete is useless. The one essential in this case is men who have a firm grasp of fundamental principles so that they can learn new techniques at short notice and with little training. This firm grasp cannot be achieved in the short time available during National Service; it requires the leisurely approach of more normal educational courses lasting many months and even years. To meet the situation, it is proposed that some National Service men should be excused the normal National Service and be required instead to attend technical schools or colleges for a day or two per week, over a period of years. At these schools they would learn the fundamental scientific principles which will be essential to them when a distant war requires them to master new techniques and equipment in a hurry. By adopting these separate principles in preparing for the two types of war, there is more hope of success than by following present practice, which attempts to do both jobs at once, with very doubtful results.

AIR POWER AND THE FUTURE OF THE ROYAL NAVY

BY FLIGHT LIEUTENANT R. BRICKWOOD

THE ROYAL NAVY BEFORE THE COMING OF AIR POWER

The Role of the Royal Navy

UP to the time of the Second World War the Royal Navy's aim was, "To so control sea communications that we could use them for our own purposes whilst denying them to the enemy." During the First World War and the beginning of the last war the Navy was able to act towards the accomplishment of this aim with only little help from ground and air forces. Such help was that provided by shore batteries and spotting aircraft operating from ships. Both of these aids were under the control of the Royal Navy. Even in 1939 the use of aircraft to extend the striking range of fleets had been scantily developed. Long-range air reconnaissance over the sea was the duty of the Royal Air Force until 1938, when maritime operations carried out by the Royal Air Force became a joint responsibility of the two Services, with the Navy having operational control.

Execution of the Naval Role

The naval role was carried out by dividing the applications of sea power into different tasks and allotting these to various, specially designed, warships. Six main assignments were made, the divisions and the type of vessel required depending primarily upon the range and the fire power needed to carry out the assignment. These tasks, under broad headings, were: the neutralization of the enemy's major naval units; reconnaissance and blockade; defence of our own seaborne traffic; and the three purely offensive roles, destruction of the enemy's seaborne traffic, bombardment, and the support of landing operations. Other roles performed by the Royal Navy were either extensions or combinations of those above; for example, the task force was generally fulfilling the dual role of neutralization of the enemy's major naval units and support of landing operations.

The Battle Fleet. When the Germans scrapped the Versailles Treaty and openly began a heavy naval rearmament programme, it was evident that the British Navy would have to be prepared to oppose large and powerful naval units. By new construction and by conversion of older ships, the battleship force of Britain was built up to what was considered adequate strength to meet any battle fleet the Germans might put to sea. The strategy of "the fleet in being" was to be adopted. That is the strategy of keeping a powerful battle fleet within range of any waters that the enemy might use, and so the major units of the British Grand Fleet were to be dispersed in strategic fashion between the Orkney Islands and Gibraltar. Although it was anticipated that this fleet would rarely be called upon to put to sea, its presence was essential as long as the enemy had a battleship force ready for action.

Long-range Forces. To maintain the freedom of the seas vast areas of the oceans have to be continually searched and watched for enemy surface movements. This required ships with long range and fairly powerful armament, and the role was carried out by cruisers and submarines. The cruiser alone has a powerful enough armament to engage any other ship except the battleship and, in company with other cruisers, can match a battleship. The submarine is able to exploit surprise to its advantage in attacking any warship. In previous conflicts close blockade has been economically carried out by both of these vessels.

Escort Duties. The convoy system which was introduced during the American War of Independence and again adopted in 1917 was brought into operation immediately on the outbreak of hostilities in 1939. The greatest menace to merchant shipping was, and possibly still is, the submarine, and to combat the underwater craft destroyers, corvettes and frigates, all having a preponderance of anti-submarine weapons, were used as convoy escort vessels. Only when heavy enemy units were known to be at sea were battleships or cruisers used on convoy duties. Coastal convoys were protected by shore batteries and armed trawlers.

Bombardment and Support. Bombardment of enemy shore targets has long been an important role for naval forces. Sometimes bombardment has been carried out in support of landing operations, sometimes as a method of enforcing a blockade and at others as a means of interdiction and harassing. Bombardment is one of the primary roles of the battleship, and for close inshore attack shallow-draught monitors and river gun-boats have been developed. When naval support forces have been used to facilitate landing operations, destroyers and other light craft have been used to secure the flanks of the attack.

THE EFFECT OF AIR POWER ON NAVAL STRATEGY

Aircraft versus Ship

During the period between the two world wars there was a good deal of inconclusive argument about the effectiveness of aircraft against surface vessels and about the substitution of aircraft for ships in certain tasks. Naval opinion was dogmatic and denied the potency of aircraft against ships, thinking of the new weapon as little more than a means of extending a fleet's vision. The Air Force opinion, on the other hand, put forward arguments which envisaged the progress of aircraft and consequently the air claims appeared to be too fantastic to be heeded by any but the enthusiasts. Aircraft carriers were constructed to serve the fleet and they carried mostly reconnaissance aircraft and a few torpedo-bombers. Only the American and Japanese navies, however, showed any real conception of the application of air power at sea and how it could be knitted in with the more normal fleet action.

Air Power's First Victories. The first real awakening came on the morning of 7th December, 1941, at Pearl Harbour, when Japanese carrier-borne aircraft, operating thousands of miles from their main base, virtually eliminated the entire American Pacific Fleet. Three days later, on the morning of 10th December, two of Britain's battleships, the *Repulse* and the *Prince of Wales,* were sunk by Japanese shore-based torpedo and bomber aircraft. One of these two ships, the *Prince of Wales,* was the very latest in design and armament. The claims of the far-seeing supporters of air power which had foretold the superiority of aircraft were vindicated.

The Superiority of Air Power. It was now evident that all surface craft were vulnerable to attack from the air and that only aircraft could give adequate protection against air attack. It had to be accepted that the movement of a surface fleet within range of a powerful air force was impossible until air superiority had been achieved over the seas to be used. By the end of 1941 it was further realized that only aircraft could properly protect convoys against both submarines and long-range bombers.

Air Power as Controller of the Seas

As the Second World War progressed, aircraft took over more and more of the naval roles and often carried them out far more effectively than had ships. Greater areas of ocean could be patrolled by long-range reconnaissance aircraft at far less cost than by the use of cruisers; the enemy could be blockaded by air attack on his shipping carrying goods to his ports; his coastal traffic could be brought to a standstill by direct air attack and by minefields laid from the air. The aircraft proved itself effective against any size of warship, whether the ship was at sea or in harbour. It could maintain its control of the seas by bombarding enemy shipyards and factories and even those supporting industries which were far in the interior of the enemy country. Thus of the many tasks which had been considered to be entirely the Royal Navy's prerogative before the coming of air power there were few that could not now be carried out by aircraft.

Limitations of Aircraft in Sea Warfare

Transportation by air has greatly increased in recent years and it can be foreseen that with increased carrying capacity, the speed, economy of manpower and time saving of air transport will mean that it will take an ever-increasing share of the carriage and logistic support of fighting units. It is unlikely, however, that aircraft will be able to supply the bulk of civilian and war industrial needs of Great Britain, which is so dependent upon imports. Sea transport will remain an essential. In the protection of convoys the aircraft carrier will continue to be necessary as long as long-range bombing aircraft have to be met by interception.

THE EFFECT OF MODERN WEAPONS ON NAVAL STRATEGY

The advent of new and more powerful weapons has a great effect on naval strategy and tactics, but probably the greatest consideration is the effect on the designs of ships and formation of fleets.

The Atom Bomb

The atom bomb has proved in tests to be a very potent weapon when used against fleets and its direct effects are to demand the dispersal of the fleet and to insist on a considerable change in the design of the ships to be used by navies of the future. Dispersal means that the conception of large fleets must end and naval strategy and tactics must be planned on the action of small units. It is possible that a well-designed vessel that is small and fast could avoid destruction by an atom bomb even within what would normally be the lethal range of the bomb. Such ships would need to be streamlined to counter the effects of blast, protected against radio activity and be highly manœuvrable. If, however, the strategy of small units is adopted, naval forces will no longer be warrantable targets for the atom bomb.

Guided Missiles

In Defence. In defence against guided missiles which have a high destructive power the greatest hope of survival lies in making the target as small as possible so that even an accurately guided missile with automatic homing is likely to miss. At sea the water acts as a very effective absorbent against the effect of near misses and, provided the ship has a shallow draught and is light enough to move with the water, it has a reasonable chance of survival.

In Attack. Rockets and similar weapons mean that a large gun platform would not be needed to give a ship a large fire power. Thus the smaller ship of the future might well have a hitting ability as great as, or even greater than, the old battleship.

The two typical examples of modern weapons quoted indicate the effect they will have on design. Both are complementary in showing the need for, and practicability of, small, fast and manœuvrable ships, and such are the only types which the Royal Navy can have any plausible reason for operating besides the aircraft carrier. Aircraft carriers must be made as small as possible and should be cheap and easily constructed so that they can be had in large numbers. Undoubtedly aircraft carriers will of necessity be expendable. The submarine fits into the new design, its ability to submerge largely making up for its lack of manœuvrability on the surface; modern design of submarines is already tending towards smaller and faster vessels.

CONCLUSION

Changes in Design

Modern weapons and the striking ability of aircraft determines the need for small, fast and very manœuvrable ships. Large battleships and cruisers would have no hope of survival in a future war, and also the aircraft carrier, which remains an essential in the pattern of sea power, must be built to the smallest limits.

Transport

The aircraft cannot displace the merchant ship for the movement of bulk supplies, but it is possible that future ground forces will become so small and self-contained that the aircraft could well be the only troop carrier and supply vehicle necessary for the army in the field.

The Balance of Power Between Air and Naval Forces

The loss by the Royal Navy of many of its major roles to aircraft and the proved vulnerability of surface craft to attack from the air means that the application of sea power is almost entirely ruled by considerations of air power. Every movement carried out by naval units is determined by the air power opposed to it and to the air support that can be expected to ward off the enemy's air forces. It would be suicide for any naval commander to plan any operation without first considering these two factors. The exercise of sea power is impossible without a favourable air situation, which is the business of air power.

Certain tasks at sea still demand, and will continue to demand, the use of surface and under-surface craft. Aircraft carriers may be needed to enable high-performance aircraft to be brought within range of the enemy; escort vessels will be necessary for close action against submarines during periods of bad weather or when other considerations make it difficult or undesirable for land-based aircraft to operate. Submarines are perhaps the form of naval vessel which will outlast the usefulness of most other ships; it is a suitable weapon for offensive action and can aid the aircraft in defence of certain coastal approaches.

It is apparent, therefore, that the requirements of the Royal Navy in a future war are severely limited and the design of naval weapons and the strategy and tactics of their operation are governed by air power and modern weapons. Air power is the ruling factor in the control of the seas.

[*The views expressed in this journal are those of the authors and are not to be construed as official opinions or policies.*—Ed.]

INDIAN AIR FORCE

"WITH THE INDIAN AIR FORCE TODAY"

BY GROUP CAPTAIN BRUCE ROBINSON, C.B.E., A.F.R.Ae.S., R.A.F.
(lately Director of Technical Services with the I.A.F.)

"THERE'S a troopship just leaving Bombay, bound for old Blighty shore. . . ." The old song is still sung on occasions, because it's a good song. The tune is good, and it brings back memories. Certainly the troopships no longer sail with R.A.F. drafts for a five-year spell in Kohat, Ambala, Drigh Road and the rest, but the song remains.

The number in the R.A.F. today with memories of India must, sadly, be declining. There are the "old sweats," who enjoyed cantonment life on the Frontier in the good/bad old days. They will remember the cold winters of the northern plains, life in the hill-stations in summer; treks and shooting expeditions during long leaves; the first "chota peg" at sundown; their bungalows, servants and horses. They probably also remember the chowkidar, with his hacking cough and guttural noises of the night. And what of the "thunder-box"? There is, too, the younger generation. Some may have sweated out a hot weather in Delhi, at "Bafsea" or "Acsea," during the Second World War; some, perhaps, spent some time at an F.T.S. or an O.T.U. in the North-West; others may have been with squadrons in the Calcutta area, and eastward through Assam to Burma, where, perhaps, they fought alongside No. 1 Squadron of the Indian Air Force. Lastly, there are some who merely passed through India, trooping by air. Their memories may be limited to the "long bar" at the "Imperial" in New Delhi, Maharajahs' palaces converted to Messes, or, at the other end of the scale, to transit camps at Mauripur and Calcutta.

The object of these notes is threefold. First to help the "old sweats" recall their memories and put them in perspective with the Indian Air Force and India today; secondly, to suggest how the store of ever-dwindling memories could, perhaps, be reinforced with some new ones; and lastly, with the Editor's permission, to put the I.A.F. more into the picture so far as AIR POWER is concerned, for the I.A.F. goes back some twenty years with the R.A.F., and surely deserves some space as a Commonwealth Air Force, though it has its own excellent publication, *The I.A.F. Quarterly*.

The I.A.F. traces its history back to the formation of one flight in 1933. From then until 1947 the R.I.A.F. (the prefix "Royal" was introduced in 1945) grew steadily until it formed a sizeable element of an Overseas Command of the R.A.F. In 1947 India and Pakistan gained their independence and each, therefore, its own national air force, the I.A.F. and R.P.A.F. of today. Though India no longer acknowledges the Crown—hence the disappearance of the "R" in the abbreviated title—she is a member of the Commonwealth, and the I.A.F. is indeed one of the Commonwealth Air Forces. In fact close ties still exist with the R.A.F., through I.A.F. personnel coming to the United Kingdom for courses, ranging from the "I.D.C." to manufacturers' technical courses; through a similarity in organization and methods in the two Services; through R.A.F. teams occasionally being invited to visit the I.A.F.; and through the handful of R.A.F. officers serving two- or three-year tours "on loan" to the I.A.F. Lastly, there are some sentimental ties, since there are Cranwell cadets among the most senior I.A.F. officers.

Let it not be thought, however, from what has just been said that the I.A.F. is, in any way, merely a poor relation of the R.A.F. The I.A.F. has learnt to stand upon its own feet, to frame its own policies to accord with the new independent India, and the next few years will surely see steady progress in what is, perhaps, the most vital field of development for this young Air Force, i.e., the attainment of self-sufficiency in supply and technical resources. The implications of the change in status of the I.A.F. since 1947, from being part of an Overseas Command of the R.A.F. to becoming an independent national Air Force, are indeed great, but they have been appreciated, and plans are laid and being executed to meet the changed circumstances.

Perhaps the best way to put service today into perspective for those who only have memories of service in India prior to 1947 is to attempt a thumb-nail sketch of a two-year tour "on loan." The starting point is the office of the Air Adviser to the High Commissioner for India in the United Kingdom. Here, in South Audley Street, London, W.1, is a comprehensive I.A.F. staff and the sincerest and warmest of welcomes. As well as being specialists in their own field the staff act as advisers and friends to the newcomer, whether it be in briefing him for his job in Delhi or in telling him what he will need to take out, or obtain in India, for life in a bungalow or in mess. Finally, they see the "new boy" off, either by air or sea.

If the passage out is by air it may well be by Air India International. If so it will be an excellent trip, a fitting and encouraging introduction to the two-year tour. Bombay will be reached about twenty-four hours after leaving London Airport. At Bombay the I.A.F. embarkation staff will take the new arrival over, and amongst other kindly actions, see that he gets a drink in their Mess. The point is made because Bombay today is a "dry" city, and yet a very thirst-making place, especially for the newcomer. The journey onward to Delhi can be made by rail or air. In an air-conditioned coach the twenty-four hours' rail journey is extremely comfortable, better than anything obtainable on the railways in the United Kingdom. A cynic has remarked that the best way to "see" India is from behind the windows of an air-conditioned coach. The "old sweats" will no doubt compare this with their memories of the old-time journeys through dust and heat. Alternatively, the journey can be made by air, and this, four hours in a Viking, will be the first of many trips to be made throughout the length and breadth of India. The internal air-lines are excellent; they still largely use the Dakota—and what a wonderful job the old lady is still doing.

In Delhi the office in the Air Headquarters block will be much like any other, except that there will be a good carpet on the floor, a "Desert Cooler" outside, a battery of fans overhead and curtains to shut out the glare of the summer. Outside the office will stand, sit or lie (according to the season) a Chaprassi. His function is to act as messenger, but he finds time also to do a certain amount of sleeping, particularly in the hot weather. There will also be a constant supply of tea—but this habit is, perhaps, not peculiar to India.

The Principal Staff Officers of the Indian Air Force, viz., the Deputy Chief of Air Staff, the Air Officer-in-Charge of Personnel and Organization, and the Air Officer-in-Charge of Technical and Equipment Services, are Indians whose names, A.V.M. A. M. Engineer, Air Commodore Arjan Singh and Air Commodore R. H. D. Singh, will be well known to many in the R.A.F. Air Vice-Marshal Mukerjee, perhaps best known, has just spent a year in the United Kingdom for the "I.D.C." course. The Chief of Air Staff and Commander-in-Chief is a Royal Air Force officer, Air Marshal G. E. Gibbs, C.I.E., C.B.E., M.C., but it has been announced in the Press that the next Chief of Air Staff and Commander-in-Chief will be an Indian Air Force officer. Below the Principal Staff Officers come the Directors and Deputy Directors, and it is in these strata that the R.A.F. officers on loan serve.

The work handled by Air Headquarters is of an Air Ministry flavour, but its functions are closely wrapped up, even to matters of detail, with those of the Ministry of Defence, with the result that Air Headquarters has not the same measure of "power" as the Air Ministry in the United Kingdom. That does not mean that the intensity of work is less. In fact the pace is hard and there is little let-up. This is, after all, not surprising, for the I.A.F. is a young and growing Service, and there is naturally much to be done. The daily round of conferences and files leaves the staff officer tired, to say the least, at the end of the day in the hot weather, and with a bag full of "homework" in the winter.

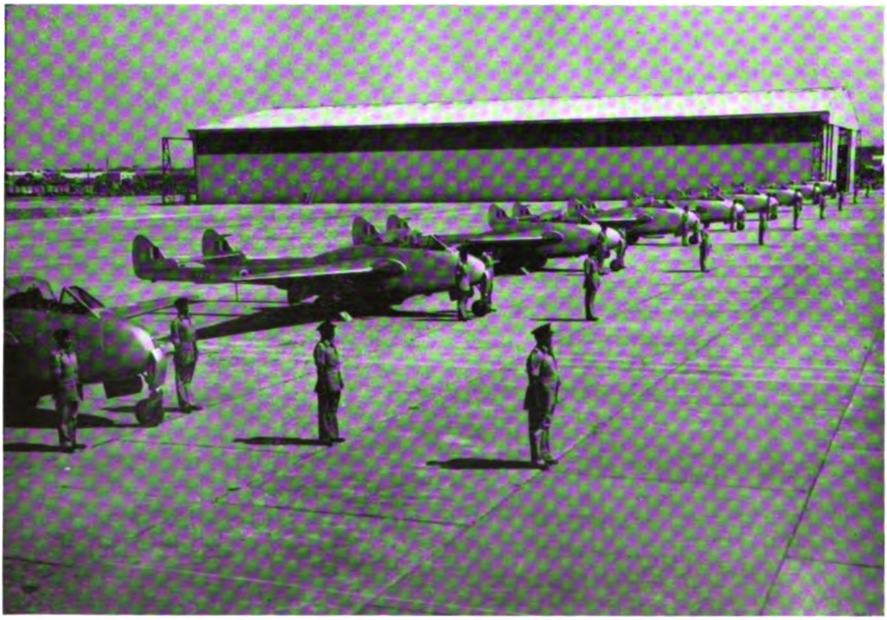
When the pressure becomes too great it is best to go "on tour." The procedure is, first to get rid of all the files, either to one's deputy or by locking them away out of sight, and then to set off on a 2,000-mile or 3,000-mile tour round the sub-continent, paying staff visits to units on such a widely-spaced circuit as Kanpur, Calcutta, Madras, Bangalore, Bombay and Delhi. This sort of extended tour would probably be done on the civil air-lines, and it would be the exception. A more normal staff visit is represented by the dash in one day from Delhi to Kanpur, Agra or Ambala and back—before lunch if it's hot. A day like this would probably start at 0500 hrs. and the Air Headquarters Communication Squadron would provide an aircraft, either as a "taxi" or for "self-drive."

The annual tour programme is, of course, best arranged so that, come the summer, staff visits lead to the more "healthy" resorts, e.g., to Wellington in the Nilgiri Hills. This surely is a paradise as regards conditions for both work and play, and lucky the man who is selected for the year's course at the Defence Services Staff College there. The Staff College has Army, Navy and Air Force wings and includes Commonwealth students. Then, again, what a wonderful break from the dust and heat of Delhi it is to fly, in June, to Srinagar, to enjoy the beautiful Kashmir scenery and the invigorating fresh air of the valley 7,000 ft. above sea level. The River Jhelum, Wular Lake, Nedou's and Gulmarg; these are names which will doubtless bring back happy memories.

Visits to I.A.F. units scattered over the length and breadth of the sub-continent will show that they are organized and working in much the same way as R.A.F. units. The family likeness is, indeed, striking, and everywhere there is a friendly and hospitable welcome. It is impossible not to feel at home. In the air young I.A.F. fighter pilots may be seen doing formation aerobatics in jets with a precision equal to any in the world. And when the I.A.F. flies past the President, as it does in the Republic Day parade on 26th January each year, the timing and execution will be perfect. On the ground, too, there is a moment of pride and nostalgia for the few R.A.F. officers when the I.A.F. contingent goes by to the strains of the "R.A.F. March Past." Doubtless the I.A.F. will

[*Official Photo*

Indian Air Force Vampires being refuelled at Palam.



[*Official Photo*

The Vampire Wing of Operational Command, Indian Air Force, lined up for inspection at Palam, New Delhi.

soon have its own march past, but for the present this audible and inspiring token remains as a sentimental link between the two Services and their past.

Periodically it will be necessary to make the 1,000-mile journey south from Delhi to Bangalore, the centre of the growing Indian aircraft industry. Here Hindustan Aircraft Limited, whose main function during the Second World War was the repair and overhaul of Dakotas, Liberators, Catalinas, etc., have developed their designing and manufacturing capacity and have recently produced a primary trainer. This, known as the H.T.2, is replacing the Tiger Moths and Prentices at Service and civilian flying training schools. More advanced types for the I.A.F. are on the drawing-board. The Company does a considerable amount of repair and overhaul of airframes and engines for the I.A.F. and the civil airlines. It also manufactures railway coaches and bus bodies. The factory is well supported in the district by technological and research institutes, and by other industries.

The journey south makes the foreigner realize how vast the country is. It emphasizes the fact that India is indeed a sub-continent, comprising many peoples having different customs, dress and languages, the Sikhs, Bengalis, Gujeratis and Madrassis, to name but a few. The importance of communications and a common language is evident. Though there are good "trunk" roads, e.g., Bombay to Delhi, Amritsar to Calcutta, etc., and an efficient railway system (except for the curse of differing gauges), the "air" has a great future in India, and is already serving the country well. As regards language, English has, of course, been the official one, and therefore nearest to a *lingua franca*, for the past two centuries, but it is the Government of India's policy to develop Hindi as the universal national language.

No note on India, especially for the Service man, would be complete without mention of sport. For India is the sportsman's paradise. He can shoot tigers and buck of every description. He can fish; he can hunt, play polo, cricket, tennis and golf—and always without fear of the weather interfering. He can play hockey, too; but not so well as the Indians. He can sail, he can mountaineer. He may have to travel a bit and be prepared to "rough" it and "take" the heat. But surely there is something to please everyone, and what is more, there is time in which to enjoy these things—or some of them—and still work hard. True, there is not so much time as formerly; nor so much money, for the cost of living has risen, as elsewhere in the world. The "old sweats" will perhaps wonder how many horses they could afford to keep today, when the bungalow staff will metaphorically run away with about Rs.350 per month—or about £25. High though the cost of living may be, one does "live." No energy has to be spent, as in the United Kingdom today, on the "chores" and the general struggle for existence. There is therefore time to work hard and play hard. The social round can indeed be non-stop, if one likes it that way, and even if one does not sometimes, especially in Delhi with its vast Diplomatic circle. Cocktail parties and dinners follow one upon the other, sometimes several in the same evening, in almost too quick succession. However, the R.A.F. officer on loan can do as much or, almost, as little of this as he pleases.

What are the snags? Maybe it all sounds too good to be true. Well, first, perhaps the heat of the long northern summer. No longer does the Government move out of Delhi, as it used to, to Simla for six months. Temperatures are in the hundreds from April to October inclusive. A month's leave in the hills is a wonderful break, but is hardly long enough for British families, who are better out of it for the five months, May to September. It is only fair to add, however, that the British business community mainly sweat out the whole summer in the plains, and save up their leave so that they enjoy six months in the United Kingdom about every two and a half or three years. Other snags? There are beggars, poverty, smells and noises—Indian music is a "noise" to the writer's doubtless uneducated ear, especially as played for weddings. But these are trivialities—part of the kaleidoscope which is India. And what country is not a kaleidoscope, with its shades of light and dark, its beauties and its horrors? But India is *big,* and her contrasts are therefore big and striking. For India is, indeed, a country of contrasts, the rich and the poor, the dry and the wet, the well-fed and the starving, the brilliant intellectual and the illiterate, the idealist and the crook and, lastly, the old and the new.

The last contrast, the old and the new, is the greatest. It is, in fact, almost a conflict. India knows that to raise the standard of living of her 400 million souls she must adopt modern methods, not only in industry but also in agriculture, and—dare one add?—even in philosophy. The old methods and ideas, bedded deep in religion, seem to militate against this change.

And so a two-year tour with the I.A.F. ends. The time is short enough to absorb even a smattering of what India contains and means, but it is long enough to bring the realization that she is passing through a critical time in her history. Since 1947 she has weathered the storm of "partition" from Pakistan, successfully shouldered the responsibility of government and established its democratic working through a freely elected House of the People. These essentials done, she has, within the first five years of taking over, drawn up plans—and started their execution—to improve the country's economics and so raise her people's standard of living.

With this background the Indian Air Force goes steadily forward, well aware of the man-size problems which it must face in achieving its aim of becoming a fully self-supporting independent national air force. The R.A.F. may, at this stage, look with pride at its younger brother, and wish him well in future years. When the last of the few R.A.F. officers on loan leaves, is it not possible that this sturdy youngster may take his place among the Commonwealth air forces and share on equal terms with the other members of the family? If an "exchange" scheme, whether applied to individuals or to units, were introduced, the I.A.F. would not be found wanting. And the R.A.F. would equally benefit. Maybe there would be no troopships leaving Bombay—but there would be new friends, new experiences and new memories for both sides.

A FUTURE FOR AIRSHIPS IN PEACE AND WAR

BY SQUADRON LEADER P. W. HELMORE, D.F.C., A.F.C.

SHORTLY after 0200 hrs. on 5th October, 1930, the R101, then the biggest airship in the world, struck the ground in undulating country south of the town of Beauvais in France, and became a blazing wreck. As a result of the official court of inquiry, the Government programme for airship development was immediately curtailed. The following year it was suspended indefinitely. So ended Britain's hope of attaining supremacy in the airship field. So, it might seem, failed Lord Trenchard's prediction that airships would be the "aircraft carriers of the future."

However, despite the discouragement of the R101 disaster, it was recognized at the time that the great potentialities of lighter-than-air craft only awaited the further development of key technical components and services. These developments are now at hand, mainly as a result of the stimulus of the past war. Yet so rapid has been the evolution of heavier-than-air craft that it has limited a full appreciation of the value of other types of aircraft. With the increasing speed and altitude performance of the aeroplane, the attributes of the airship tend to be forgotten. It is too often regarded as a forlorn competitor rather than as an essential partner in the full use of the air medium. In a lecture to the House of Commons on 28th June, 1920, that great pioneer of the airship, the late Air Commodore E. M. Maitland, said: "I wish to make it quite clear that commercially the airship has not proved itself in this country. The reason is not far to seek: they have not yet been given their opportunity." That statement is just as valid today.

ADVANCES IN TECHNOLOGY AND OPERATING EXPERIENCE

Analysis of past accidents indicates that they were due, either separately or in combination, to three main causes: structural failures, the use of inflammable gas and the lack of operating experience—particularly in regard to turbulence. Against this background, however, must be measured the recent technical advances in materials, engineering and aviation experience.

In regard to structural failures, no German rigid airship was lost through this fault despite extensive operations in all weathers. This was probably because the Zeppelin had the benefit of continuous research. In Britain, research was either blocked by lack of funds at one time, or pushed forward too hurriedly for political reasons at another. The British R38 and the R101 were lost during the experimental stage through failures which might have been avoided if research could have been assured of continuous Government support. However, German information on rigid airship construction is now available. Moreover, extensive research in structural methods has been conducted in the U.S.A. since the last airship was built. Metallurgical development has produced stronger and lighter alloys. There have been great advances in plastics and fabrics. It is therefore certain that future rigid airships could be built stronger, safer and more efficient as regards payload than their predecessors.

Many airship accidents would have been less catastrophic if helium gas had been used. America has plentiful supplies of this non-inflammable gas and would probably make it available to potential users in Western Europe. Although it is eight per cent. less efficient than hydrogen, the loss in lift would be offset by the structural improvements already mentioned. At present helium is more expensive. However, with the latest processing methods and quantity production, costs can be brought into line. Moreover, since helium is less liable to diffusion through the airship's gas cells, and is more easily re-purified, its use should prove an over-all economy.

Meteorological services have been improved in recent years and are of first importance in successful airship operation. The great range and endurance available enables airship captains to avoid bad weather centres or turn them to advantage. In 1929 Dr. Eckener made use of a typhoon to pilot the *Graf Zeppelin* across the Pacific from Tokio to Los Angeles in the record time of sixty-nine hours. Thanks mainly to American research, much more is now known about turbulence and the flying techniques to minimize its consequences.

From the information available, it is fair to conclude that airships are no more adversely affected by weather than aeroplanes. Indeed, the evidence points the other way. Dependent on aerodynamic lift, the aeroplane must approach its runway at relatively high speed, and even with modern instrument approach aids every landing in thick fog is an emergency with no margin for error. In the same conditions the airship could come in as slowly as required. With radio and radar aids it could alight at a mooring mast over a busy metropolis with absolute safety.

The airship is a displacement craft, floating in its natural medium, the air. Unlike the aeroplane, which absorbs a high percentage of power in aerodynamic lift, the total power resources of the airship are devoted to propelling it through the air. This is the primary reason for the amazing economy in operation, particularly at long range, which is referred to later. Aerodynamic lift is a useful by-product of the airship's speed. A proportion of this lift is used for altitude control, the remainder being available for additional payload. Total drag is composed of frictional drag over the hull and the parasite drag of appendages. In the past, parasite drag has been as much as fifty per cent. of the total drag owing to disturbances in airflow. With modern plants and the use of stern propulsion and other methods of improved streamlining, great advances in airship efficiency are possible. In 1945 America had plans for airships with cruising speeds between seventy-five and ninety-five miles per hour, a maximum range of 11,000 miles, and the ability to lift eighty tons of payload over 7,000 miles. Today better performances could be expected.

THE COMMERCIAL ASPECT

When choosing any form of modern transportation, safety is the first public consideration. It is not generally appreciated that the commercial airship safety record is unequalled by aeroplanes. Up to 1937, German commercial airships carried more than 51,800 passengers over 1,403,000 miles without accident, including 1,000,000 miles over the Atlantic route.

Comfort is a most important feature of popular travel, and often essential to the efficiency of the busy executive at the end of his journey. In airships of the types planned by the Goodyear Company, dining and recreation rooms would be available to at least 112 passengers with the luxury of over sixty square feet each, including cabins; or alternatively to 300 passengers, each enjoying more space than the aeroplane will offer for many years to come.

Absence of noise and vibration is a powerful selling point. Recent comparative tests have shown that ocean liners register seventy-one decibels, airships only fifty-one. Owing to the inherent stability of the airship, there is no problem of air-sickness. In conditions where the ocean liner is rolling in rough seas and the aeroplane is affected by air pockets, the airship rides serenely with no indication of movement in the vertical or lateral planes.

No scheduled flight was ever cancelled or turned back through weather or for any other cause in the history of commercial airship flying. With the ability to land and take off in weather when aeroplanes are grounded, and to repair mechanical faults in flight if necessary, the airship should be able to maintain this standard of reliability in future.

As regards speed, a modern airship would be more than three times as fast as ocean-going liners. At cruising speeds it could make the 3,500-mile crossing from London to New York direct in under forty hours; the journey from Southampton takes the *Queen Elizabeth* five days and the *Mauritania* a week. For journeys up to 3,000 miles airship times could not be compared with aircraft of the Stratocruiser class, but there would be surprisingly little disparity in elapsed time over the longer stages. At their extreme range, airships may well have the advantage over many routes. The ability to descend in the vertical plane means that the airship could deliver passengers or freight to any selected terminus in the world, thereby saving the time and expense involved in transference from distant aeroplane or shipping bases. Passengers, mail or freight could be on- or off-loaded at intermediate points by feeder-line aircraft without relaying the airship between long flight stages.

Studies show that on flights of more than 2,500 miles airships could operate at one-half of the cost, in per-ton-mile figures, of the aeroplane. Moreover, as the flight distance is extended, so the operating cost per mile is reduced in favour of the airship. The main advantage would be in the carriage of freight, which could be transported in far greater quantity and much more cheaply. Although freight charges and capacities would be unable to rival the ship, urgent, bulky and fragile cargoes could be transported at greater speed direct to the final destination without the need for elaborate pre-packaging. All classes of passenger fares would compare favourably with aeroplane and ocean-liner travel for equivalent journeys.

The value of airships for tasks of a specialized nature was demonstrated when the *Graf Zeppelin* landed unaided among the ice-floes of the Arctic Circle to transfer meteorologists, mail and stores. Amundsen used the Italian semi-rigid *Norge* for North Pole exploration in 1926. In emergencies such as the flood disasters of 1953 airships would have proved invaluable for rescue operations and the delivery of repair equipment to the breached sea defences.

Airships represent a logical step in improving the performance of surface vessels by lifting them into a medium 1/800th the density of water, and it is apparent that they also meet certain airborne requirements more effectively than the aeroplane. There should therefore be a place for them in the transport system of technically competent nations. This applies particularly to countries such as Britain and the U.S.A. because they are flanked by vast sea expanses and airships are best suited to long-range oceanic travel. Ship, airship and aeroplane services would be closely co-ordinated, remembering that if better over-all transportation facilities are available to the home and foreign public, all the carriers benefit. Initial Government support would be needed to start a service, but costs would not be high compared with annual expenditures on aeroplanes and their costly runway facilities. In the long run, investment in the airship may prove an economy, as it could be operated at a profit which would be offset against the heavy Government subsidies needed for other methods of transport.

EMPLOYMENT IN WAR

A nation's transport system is of vital importance in planning for war, and the conversion of commercial transport for military uses must be considered. The non-rigid "blimp," particularly useful in peace for aerial survey, photography, test developments and the initial training of personnel for the larger rigid types, has proved its worth for coastal patrol and anti-submarine work in two World Wars. During the First World War allied "blimps" escorted convoys for 89,000 hours, covering 2,250,000 miles, and no convoy was attacked by submarines. In the Second World War American "blimps" maintained the tradition; no sea-going ship was sunk by U-boat while under airship escort. Airships may well prove the answer to the "Schnorkel"-equipped submarine operating in coastal waters.

The time-honoured objection to the use of the rigid airship in war is its vulnerability. The airship's structure is so sub-divided into multiple sections that, with helium gas, it would have a far greater capacity to absorb punishment than the aeroplane, particularly as it would not depend on aerodynamic lift. Moreover, the airship would provide a steady platform for powerful defensive armament, and could carry fighters of better performance than those designed to operate from land bases. In any case, as Admiral King, of the U.S. Navy, pointed out, the question of airship vulnerability is "a matter of proper employment."

The primary role of the rigid airship would be long-range reconnaissance and anti-submarine duties. The main argument for retaining the seaborne aircraft carrier is the need for air and anti-submarine convoy protection in large ocean spaces. This work could be done more effectively by the powerful airship, and would be more economical than using land-based aircraft operating perhaps 2,000 miles from their bases. In 1942 allied shipping in mid-Atlantic was beyond the range of shore-based aircraft protection and sustained heavy casualties from German U-boat attacks. These attacks could have been countered more effectively if a few rigid airships had been available.

Given the degree of air superiority which aeroplanes need to carry out route transport operations and the movement of air-transported forces in rear areas, airships would often prove more suitable for these tasks. Casualties could be evacuated with speed and comfort. Essential, bulky equipment and large numbers of personnel could be ferried with safety across seas infested with enemy "Snort" submarines. Much effort is being expended on the development of large troop-carrying helicopters; there would be few occasions when airships would not be more useful.

CONCLUSION

The rigid airship could meet certain requirements more effectively than the ship or aeroplane, and has a logical part to play in commercial transport systems from which both the carriers and public would benefit. If properly employed in war the airship could be valuable, but so far only the non-rigid type has had the chance to prove itself. Support for the larger rigid type has been delayed through a prejudice unjustified in the light of technical progress.

The airship has a future. Sooner or later it will be reinstated, and the nation first in the field will profit most. Airship development is a challenge to the mechanical genius of man, and calls for courage and imagination. These qualities have not been lacking in Britain in the past, but the question is not merely a matter of national prestige. The question is, to quote Air Commodore P. F. M. Fellowes: "Are we economically justified in abstaining from airship construction, and are we right in dispensing with their services as a means of combating the submarine menace?"

THE AIR FORCES IN PARLIAMENT

(*This article was completed on 13th February, 1954*)

SPEECH BY THE MINISTER OF DEFENCE

ON 28th January, 1954, in the House of Lords, Viscount Alexander of Hillsborough, a former Minister of Defence, asked Her Majesty's Government whether the present Minister of Defence (Field-Marshal Earl Alexander of Tunis), who was not in the House at the time, had been authorized to make a speech on defence policy at the Constitutional Club in London on the previous day, reports of which had appeared in the Press. It was alleged that the speech contained a first announcement of important changes in defence policy which should properly have first been communicated to Parliament.

The Lord President of the Council (the Marquess of Salisbury) assured the House that the speech did not contain a "first announcement of a new trend in Government defence policy," but "was mainly the reaffirmation of statements which had already been made, in one form or another, by responsible Ministers."

With the point at issue between Viscount Alexander of Hillsborough and Her Majesty's Government we are not here concerned; but it serves to draw attention to the Minister of Defence's public speech, which certainly contained much that will interest the Air Forces and indeed all three Services.

Lord Alexander said that he and his colleagues in the Government, with the advice of their military experts, had formulated a plan of rearmament which would carry the nation forward into the years to come within the limits of what it could afford. "I am convinced," he said, "that the plan we have evolved is a sound and sensible one, because it is realistic and it faces facts."

The facts he quoted were these: (i) "There can never be absolute military security"; (ii) "No country can afford to expend more than a certain amount of its money, manpower, materials and manufacturing capacity on armaments without wrecking its economy"; and (iii) "It is not possible to select a particular date on which we must be ready for hostilities down to the last button." These are indeed axiomatic and it is comforting to be assured by so eminent an authority that Her Majesty's Government are fully aware of them. But we need to be assured also that as much as possible is being done, within these limits, to build up our defences against aggression. This too we are assured by the Minister of Defence, who added: "We have substituted, for the uncontrolled rush to arms at any price, the long view and the steady, calculated build-up of our military strength . . . and all this will be within a financial and economic framework which we can afford—not only for this year and the next but for the years which lie ahead of us."

Coming down to detail, he said it was hoped that "the two best types of fighters in the world, the Swift and the Hunter," would soon be in squadron service with the R.A.F.*; and that the first of the new "V" class medium jet bombers, which would be able to carry the atom bomb, would be in service this year (1954). Here it is assumed that Lord Alexander was referring to the Vickers Valiant; but he gave no forecast of the date when the other "V" class bombers, the Handley Page Victor and the Avro Vulcan, would be ready. Nor did he mention the Gloster Javelin all-weather fighter. Guided missiles, he said, though still in the development stage, were showing considerable promise, but their mass production was yet "a little way away."

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* It was stated in the *Daily Telegraph* on 11th February, 1954, that "No. 56 Squadron will probably be the first in the R.A.F. to receive Vickers Supermarine Swift swept-back wing jet fighters," and that "deliveries to the R.A.F. are expected to begin in the next few days."

The aim of Her Majesty's Government was to build up a mobile strategic reserve in the United Kingdom ready to go off and deal with any emergency anywhere at any time. In terms of money the United Kingdom's defence effort had increased by over 100 per cent. since 1950 and was now costing about £35 a head of population. That was a larger proportion than any other European N.A.T.O. country was spending.

THE NEW RIFLE

The new rifle that is to be adopted for the British Army was the subject of a heated debate in the House of Commons on 1st and 2nd February. Although the new rifle is primarily for the Army, doubtless the other two Services will in due course be equipped with it, including the R.A.F. Regiment and all other members of the R.A.F. who carry a rifle as their normal firearm. So the matter is germane to this article.

Mr. Woodrow Wyatt (M.P. for the Aston Division of Birmingham) violently attacked the Prime Minister for his alleged weakness in giving way to the Americans and not choosing a rifle of British design (the E.M.2) which the speaker declared was better, and had been declared by experts to be better, than the rifle chosen (the Belgian F.N.). We need not here concern ourselves with the somewhat acrimonious debate which Mr. Wyatt initiated, except perhaps to regret that it ever took place.

Careful examination of the evidence leads to the conclusion that there is little if anything to choose between the two rifles in the matter of performance and serviceability. Both are excellent weapons and one has been chosen. If any one factor more than another determined the choice it was that the adoption of the Belgian rifle made complete standardization throughout the armed forces of the N.A.T.O. countries much more likely; and this advantage might even have been allowed to outweigh some slight inferiority in the weapon chosen, though in fact there does not appear to be any inferiority. And in the matter of national interest, although the honour of selection has not been accorded to British designers, the rifles for the British Services will normally be manufactured in Britain (under licence, presumably, from the Belgian company); so that our small-arms industry will lose nothing by the choice of a rifle of foreign design. Moreover, the British Army has often in the past been armed with rifles and guns of foreign design.

The new rifle, according to the experts, if used on automatic gear can fire at the rate of over 600 rounds a minute; and on semi-automatic gear (i.e., self-loading and trigger-pressing for every shot) it can fire fifty or sixty rounds a minute. The British E.M.2 could do no more. Sir Winston Churchill doubted very much whether there was "any real military advantage in these extraordinary rates." Only an exceptionally highly trained expert soldier in ideal conditions could aim and fire accurately fifty or sixty single rounds a minute; the ordinary soldier or airman in the heat of battle would be far more likely to blaze away all his ammunition ineffectively if he fired at such a rate; and the supply of ammunition in the field is a very real problem. "It is remarkable, and indeed odd," the Prime Minister continued, "that the more efficient firearms have become the fewer people are killed by them. . . . In fact, the semi-automatic and automatic rifles have, in a certain sense, gained their triumph by largely putting an end to the very mass attacks they were originally designed to destroy."

In conclusion, here are three apt quotations from *The Times* of 3rd February, 1954: "An infantryman needs to have full confidence in his personal weapon. It is questionable whether the past two days' discussions of the new F.N. rifle in the Commons will have greatly recommended it to the recruit who will one day use it. He may imagine that he is getting the second best, but he will be wrong. It is a very fine rifle indeed. . . . In the long run, it is the bullet, not the rifle, that kills. The new standardized N.A.T.O. bullet of .30in. calibre is one of the brightest achievements in Lord Alexander's term of office. . . . The rifle is the section weapon with which riflemen hold their ground, and now at long last the British rifleman can look forward to something that is modern, effective, and superior to the rifles used by his American brothers-in-arms."

SERVICE OFFICERS' CONDITIONS

The financial and domestic conditions of Service officers occupied the attention of their Lordships' House on 3rd February, when Lord Stratheden and Campbell drew attention to this very important matter, a matter which is no less important to the nation as a whole than it is to the individual officers concerned. Unless conditions are improved, there will be a grave risk that the quality of those who offer themselves in the future for commissions in the Fighting Forces will deteriorate—indeed it is said to be deteriorating already—and some of those who now hold Her Majesty's commission, particularly officers with families, may find it necessary, for perfectly good and urgent financial reasons, to resign their commissions and seek more remunerative employment in civil life.

While conditions in the Navy, Army and Air Force differ considerably, there are certain basic difficulties which face officers in all three Services—difficulties mainly concerned with the education of their children and, at the same time, with the maintenance of a certain minimum standard of comfort and appearance which is appropriate, and indeed necessary, to their rank and status.

Lord Stratheden and Campbell admitted that a young officer, provided he is single, can now live on his pay and in fact many are doing so quite satisfactorily; but, he said, real hardship exists among married officers, particularly in the "middle ranks." He attributed this largely to the 1946 Code of Pay and Allowances, as a result of which there was "very little difference between the total emoluments of married and single men." "The single officer," he said, "is relatively better off than before 1946 and the married officer is worse off." The taxation of the marriage allowance partly accounts for this disparity and hardship. If, as can be proved, marriage allowances are insufficient to enable an officer to maintain the appropriate standard of comfort and appearance for his family and to bring up and educate his children as they should be brought up and educated, then the only reasonable course would appear to be to increase those marriage allowances.

The hardships mentioned would exist, in present circumstances of pay and allowances, even if there were no cold war; but the cold war aggravates these hardships for many married officers. The need for frequent postings to meet the cold war situation often results in the separation of an officer from his family, for long or short periods, with consequent additional expense caused by having to keep two homes going. But perhaps even more important is the effect on the children of school age. Frequent changes of school are admitted by all educational authorities to be very detrimental to the child's education. Lord Stratheden pointed out that an officer suddenly posted to Malaya or Kenya or the Canal Zone could tackle the problem of the education of his children in one of two ways: either he could "park his wife and children at some spot at home and make up his mind to a long period of separation; or he must send his children to a boarding school while his wife tries to follow him and at the same time keep in touch with her children." The first alternative, though sometimes chosen, cannot be regarded as a reasonable policy; so we are thrown back on the second alternative, namely, a boarding school. Here State education is not really a practicable proposition; and so the officer has to send his children to a private school with ever-increasing fees, and during the holidays at least will have to face the additional expenses of a dual establishment.

In Germany the problem is largely solved by the provision of two colleges for the education of the children of Service officers and of members of the Control Commission; but only where there is a large and continual concentration of troops and British civilians can this solution be applied. In most overseas stations the dilemma remains. The "real remedy," which Lord Stratheden suggested, "and the only one which would be both immediate and practical in its effect, would be special education allowances—of course, under certain conditions—to officers with children of school age."

Lord Stratheden's representations were well supported, notably by the Earl of Lucan, Lord Thurlow and Lord Jeffreys; but when the Minister of Defence (Earl Alexander of Tunis) rose to reply he could unfortunately offer little hope of redress. He did, however, say that the matter of officers' conditions was "constantly in his mind" and was also "the subject of anxious thought and careful study by his three Service colleagues." He blamed the international situation for most of the circumstances that gave rise to the hardships mentioned and expressed his determination to "bring them to an end, or at least to alleviate them," as soon as possible. In mitigation, he reminded their Lordships that Her Majesty's Government had introduced, with effect from 1st March, 1953, "married (unaccompanied) rates of local overseas allowance" which were designed "to enable a married Service man separated from his family to take part in the social life" of the station to which he was posted, and to share in its amenities and recreations, "without feeling that he was depriving his family at home of an adequate contribution to their maintenance."

The level of officers' remuneration, he continued, was constantly under review; and he suggested that the "hirings" scheme, adopted by all three Services, provided a certain "easement." He assured their Lordships that the Government realized "only too well" that if the education of children is not to suffer by reason of frequent moves of the father, "provision must be made for the boarding education of the children"; but, he said, the problem was complicated and the only hope he could offer of real relief depended upon some considerable improvement in the international situation.

VALLEY AIRFIELD

Mr. Cledwyn Hughes, Member for Anglesey, made a strong and eloquent plea for much more extended civilian use of the airport of Valley. It was a mistake, he said, to site transoceanic terminals only in or near big cities. Many aircraft passengers did not want to go to the big cities, and there were "no doubt many who, once having landed in North Wales, would not want to leave North Wales."

There were many and excellent reasons why Valley should be one of the main airports on the western seaboard. Its suitability was beyond question and it enjoyed excellent weather conditions.

In his reply, the Under-Secretary of State for Air (Mr. George Ward) admitted the excellence of Valley as an airport; but, he said, in spite of its manifest advantages, very few diversionary landings had been made there recently and they were not by transatlantic aircraft; so it was to be assumed that it was not popular with civil operators, probably because of its distance from the main centres of population.

Incidentally, Mr. Ward also said that there might be a case for stationing a R.A.F. marine craft unit at Holyhead for reserve and rescue duties.

R. F. P.

THIS JOURNAL CRITICIZED IN PARLIAMENT

Added 20th March, 1954

On 17th March, Capt. Ryder, M.P., R.N. (Retd.), asked the Under-Secretary of State for Air what assistance was afforded by his Department in compiling the publication AIR POWER?

When informed that an Air Ministry Advisory Committee existed to give the Editor any advice for which he asked, Capt. Ryder requested the Under-Secretary of State to keep a watch on this publication, because certain of the articles in recent issues were of a contentious nature and, in his view, calculated to foment ill-feeling between the Services.

The Under-Secretary of State replied, "As I understand it, the policy of the Editor of this periodical is to throw open his pages to constructive debate on important matters of air policy, even if they are controversial."

Mr. Shackleton gave encouraging support to our policy when he asked the Under-Secretary of State, ". . . to continue to give all the support he can to this publication and in no way inhibit freedom of expression."

EDITOR'S NOTE.—All articles express the personal views of their authors and are not to be construed as official opinions or policies.

A clear statement of our policy concerning the publication of controversial articles on the defence of this country was given on page 125 of the Winter, 1953, number of AIR POWER.

[EDITOR]

A FLIGHT IN A NON-RIGID AIRSHIP

By Squadron Leader J. R. Musgrave, D.S.O., R.A.F.

IT occurred to me, as I gazed down idly on the sunlit waters off the North Carolina coast, that I must be one of the very few serving R.A.F. officers who have ever experienced the strange sensation of flight in a lighter-than-air craft. It was certainly a unique experience for me.

During recent months I had often watched these silvery monsters gliding eerily around the sky looking rather like huge fish in some limitless aquarium. I had always given them a wide berth, however. They struck some chord in my memory—"General Flight Rules," "Right of Way Procedure," "Aeroplanes give way to airships." "Pointless, old-fashioned stuff!" I had once thought. Not now though. There they were in reality, and, after all, the rules had to be written down somewhere by somebody. Maybe it was just as well somebody had done.

Anyhow, here I was actually riding in one of the things. It had taken me twelve long months to co-ordinate the various factors—time off from the office, a friend to wangle the ride, the weather, and so on—all the usual problems. But it had come off at last. The United States Navy had worked the oracle for me.

A short hop down to the airship base, and within a few minutes a jeep had delivered me to the blimp which was floating idly at its dispersal point, motors running, and drifting back and forth ever so slightly in the breeze, its nose tethered to a kind of mobile tripod affair. For a few moments I stood at the bottom rung of the ladder which led to the crew's quarters, looking at the enormous mass of silver fabric above me. Then the captain jumped down to greet me and escort me aboard. As I climbed into the roomy cabin I suffered the same queer embarrassed feeling I always experience when boarding a naval ship. Should I salute the quarter deck? And if so, where was it anyway? I looked round anxiously, but my eye fixed on a galley stove and, on the other side, an "Elsan" seat. It all seemed quite incongruous, so I decided to skip the saluting, and anyway the captain was already thrusting a "Mae West" at me and beckoning me up to the front where I could watch the take-off procedure.

The "office" was similar to that of any large heavier-than-air craft, except that all the "dashboard" stuff did not exist and the perspex continued down to the floor in one huge, glorious bubble, giving the most wonderful forward visibility I had ever come across. Two pilots sat side by side, and I sat on a stool in the space between them, and slightly to the rear. The pilot in the port seat was apparently responsible for fore-and-aft level. He had one major control, a huge wheel on his right-hand side, rather like an overgrown elevator-trim control, or a steering wheel removed from a ten-ton lorry. The other pilot, on the starboard side, had one large wheel in front of him. Presumably he steered the thing. There was naturally an enormous number of valves, switches, levers, and so on, all vividly coloured and marked boldly—"Helium," "Air," "Water Ballast," and so on—all rather disconcerting, and it was with relief that I was able to pick out a few familiar dials such as altimeters, A.S.Is., tachometers and manifold pressure gauges.

A tractor hitched itself on to the tripod affair, a score or two of men grabbed hold of various ropes which trailed down from what, to me, seemed to be the sky some distance ahead, and we were towed in a graceful sideways motion to the take-off point. The tripod was detached and towed away, our sole remaining contact with the earth then being the ropes and the men holding them. They grinned expectantly at us through the perspex. Was I right when I thought that in one or two grins I detected a trace of amusement at the sight of the apprehensive-looking officer in R.A.F. uniform who sat between the two pilots? Maybe, but I had no time for further reflection for the motors were opened up and we were moving forward slowly, not unlike the start of a take-off in a conventional heavier-than-air craft. The men holding the ropes broke into a trot, and then after a little while let go as we soared slowly into the blue, the ropes dangling loosely below. The angle of climb grew steeper and steeper—so steep, in fact, that as I had no back-rest to my seat I had to cling on in order to prevent myself from sliding right back to the rear of the cabin. "My God!" I thought, "it must stall soon. Just look at that airspeed!" Deep down in my heart, of course, I knew it couldn't stall; nevertheless, it still seemed a thoroughly unnatural performance to me.

Very soon, however, we were cruising along comfortably at a few hundred feet, "formating," at a distance of about a couple of miles, on another airship with which we were going to carry out a joint anti-submarine exercise. We climbed up to 1,500 feet to clear a bank of low stratus. "We don't belong up here," growled the navigator to me. "This isn't our country. We belong down there." He pointed to the sea through a gap in the clouds. I expressed my sympathy, though I felt contented enough.

I was touched on the shoulder by the pilot from the starboard seat. He had climbed out and was offering me the position of honour behind the steering wheel. I accepted eagerly and tried my hand. "Don't try to steer her," the pilot warned me. "Just coax her gently the way you want her to go." Good advice. The response, by conventional aircraft standards, was very sluggish. The ship wallowed like a flat-bottomed boat. And yet there was a positiveness about the control which one could feel after a while, and bearing in mind the enormous bulk of the thing, the response was remarkable.

From time to time the pilot in the port seat would pull one of two wire toggles located in the roof above him. This was accompanied by a clanging noise up in the envelope somewhere. I understand that it had something to do with altering the centre of gravity, causing helium to flow from one end of the ship to the other—all very baffling.

We lost the low stratus and sailed on at about sixty knots or so down one of the innumerable creeks that lie along the coasts of North Carolina and Virginia. Then we floated across some sandbanks, over the surf twinkling in the sunlight, and slowly out into the broad Atlantic where our exercise began. The exercise itself was something of a mystery to me, but it gave me a wonderful demonstration of what an ideal anti-submarine aircraft a blimp can be. That is for operations in certain parts of the world at any rate, the U.S. coasts for instance. Not so good, I thought, for operations in Europe, with the North Atlantic weather and the possibility of unfriendly fighters. I reflected, however, that there are lots of spots throughout the Commonwealth where such aircraft might be very useful, South Africa, Aden, Ceylon, Australia, for instance. A big problem. I needed more time to think about it. And more facts. For instance, how much would it cost to build and operate a squadron of one of these things?

Anyway the exercise was over, and my thoughts were interrupted by the sight of a glorious steak with all the trimmings which had appeared from the galley. "This is a gentleman's way to fly," I thought as I pushed back my cuffs.

A little later, as I sat drowsing in the sunlight and the soporific drone of the motors. the coast reappeared ahead. Once more the surf and the long yellow sandbanks stretching from horizon to horizon, dotted here and there with little white cottages. By chance (or was it subtle design on the pilot's part) we crossed the coast at the very spot where the Wright brothers made the first man-carrying, heavier-than-air flight, fifty years ago. Hitherto, I had always made a very humble mental salute whenever I had flown past the monument which marks the spot. Today was different.

I gathered during my trip that these aircraft, known as "K" ships, are some 266 ft. long, 82 ft. high, and 62 ft. in diameter. They are non-rigid airships, there being no internal structure to maintain their shape. The car or gondola is quite spacious, being some 43 ft. long, 8 ft. wide and 14 ft. high. They weigh about 25,500 lb. and can carry around 6,500 lb. of stores and armaments. It was interesting to learn, too, that at take-off a blimp is slightly heavier than air, by some 1,500 lb. or so. The extra lift necessary for ascent is provided by both the expansion of the helium under the sun's heat, and the short take-off run which creates lift from the air flowing over the aerodynamic contour of the envelope.

We sailed on up the river, over the marsh and swamp which covers so much of this "tidewater" region of the South-Eastern United States, and then the huge sheds of the U.S.N. airship base came in view once more. "Now, of course, someone has to get the thing down," I remembered. "This should be interesting to watch." Compared with a landing by heavier-than-air craft, it was a most leisurely procedure. It commenced with the ship standing by in the circuit and being "weighed off." This had something to do with balance and buoyancy, I gathered. Anyhow, it was a fascinating part of the flight. We hovered, apparently motionless, with engines throttled back, a few hundred feet above the ground. I was intrigued. I had never done this before, except with difficulty in a Tiger Moth and a high wind. I vaguely recalled stories I had heard of German Zeppelins over England in the First World War, when observers on the ground reported actually hearing the crews of the Zeppelins shouting to each other.

The engines came on again, the nose went down at what to me seemed an alarming angle and we were obviously committed to a landing. But there was still no hurry about it. One of the pilots lit a cigarette, and over his shoulder related a lengthy anecdote to me of some previous experience in landing from the same direction. I'm afraid I didn't pay very much attention to his story. I was too interested in the present landing. With each tiny change of wind velocity the ship seemed to swing round disgustedly, and those dangling ropes, whipping about like sensuous snakes, seemed far too short to be caught by the small ant-like group of men which was leisurely assembling in the landing area. I had the same worried, helpless feeling as a nervous passenger has aboard an ocean liner when it is docking.

At last, almost imperceptibly it seemed, though quite suddenly in the end, we were almost down. The motors were in reverse pitch, the ground handling crew were rushing forward and grabbing the ropes, and within a few seconds, nearby, friendly faces were grinning satisfaction through the perspex.

After handshakes all round, I dropped out on to the tarmac and into a waiting jeep. My first blimp flight was over.

Back in the squadron commander's office I was duly handed my official membership card of the Benevolent Brotherhood of Balloon Benders, a memento I still retain with pride. Of one thing at least I am now quite certain: if ever I am offered a choice of aircraft in which to have an engine failure, I know just exactly which type to choose.

NOTES FROM THE FAR EAST—I

By Wing Commander C. N. Foxley-Norris, D.S.O., R.A.F.

MANY Service people arriving in Singapore for the first time have previously served elsewhere in hot climates, in peace or war; if not, they have read about conditions, or heard about them from other brown-kneed types, who are always ready at the drop of a topee to reminisce on the delights and hardships of overseas service. To the tyro in Singapore perhaps the first impression therefore consists largely of surprise at the things he doesn't encounter rather than the ones he does.

For example, to take the article just mentioned—no topees. We all know those pre-war pictures of the airmen in the Far East, working on their aircraft, stripped to the waist but religiously topped with the inevitable massive headpiece to ward off the lethal rays of the tropical sun. His modern counterpart appears to suffer no ill-effects from a complete lack of head-covering at work; and although the authorities are experimenting with various fetching models of head-gear, based on anything from the Australian slouch hat to the American baseball cap, it remains to be seen whether the airman, having established his immunity, will show any enthusiasm for them. Perhaps our skulls are thicker nowadays; many senior officers seem to think so.

The next shortage noted—and a very welcome one to those with experience of the Middle East or India—is in the insect life encountered. Both flies and mosquitoes are conspicuous by their absence. The former are definitely rarer than in an average English summer, and the latter about the same in Singapore, though, of course, up country in the jungle it is a different story.

This unexpected blessing is even more surprising when one observes the presence of all the phenomena normally associated with a full plague of insect life—stagnant water, swamps, ample foliage, open drains, native villages, and so on. Nevertheless, the insects are absent, and the arrival of a fly in an office produces much the same reaction in the occupants as their appearance on a duty officer roster—incredulous surprise and indignant telephone calls to the unit commander.

The climate of the Far East, home of mad dogs and Englishmen, is notorious, but at first encounter its horrors seem to have been exaggerated. It is certainly very hot, and one of the drawbacks to Singapore is that compared, say, to the Middle East, there is no appreciable cooling at night. The humidity is also very high, but most buildings are designed for the climate, fans are plentiful, and conditions generally strike the newcomer as tolerable. The old hand, however, will tell him that the almost complete lack of seasonal variation of weather and temperature becomes unpleasantly monotonous, and that generally speaking the effect of the climate is cumulative, particularly mentally and psychologically. The rust and mould that accumulate so rapidly on all forms of machinery tend also to affect the mental cog-wheels, unless a conscious effort is made to keep them revolving briskly.

Living conditions are good, though by no means cheap. The service wife revels in the rare modern luxury of having a servant, or even servants, and social amenities are numerous whether one's tastes are oriental or occidental. Prices are generally high, but not universally so, and certain things, notably cigarettes and motor-cars, are cheaper than at home. A good two-year-old car costs only about half its basic price at home, and as a result service car parks present a picture quite markedly different from those at home, pre-war cars being about as sparsely represented as are post-war ones at home. The service owner, revelling in this opportunity, will, however, not find that driving in the colony is an unmixed delight. Many are the pitfalls that await the newly arrived, including the Unexplained Traffic Regulation, the Haunted Chinaman, and the Gregarious Learner.

The Singapore police have evolved several novel and ingenious tricks which must be the envy of their slower-witted European brethren. The commonest and most successful is the Unexplained Traffic Regulation. The system adopted is to produce as many regulations, traffic ordinances, signs and devices as possible, with infinite and rapid variations, but not to tell anyone their significance. Contravention is inevitable in the circumstances, as lines, white, yellow, dotted, double, triple, straight and wavy, spring up on the roads overnight, each supervised by a policeman armed with an enigmatic smile, a large notebook, and a brand of English unintelligible to anyone but himself. The pervasive principle of operation is "Ignorance is bliss"; the ignorance is for the motorist, and the bliss for the policeman, the magistrate, and the exchequer.

The Haunted Chinaman is not such an unusual phenomenon as he may sound, for it transpires that all Chinese are haunted. Each is closely followed about at all times by his own personal devil, ever alert to trip him up either physically or in business or social matters; to give him that aggravating and unreachable itch below a shoulder-blade; to cause him to stand below a falling laundry staff; or otherwise to make life unpleasant for him and make him lose the all-important face. This fact, for such it is accepted to be, accounts for what is otherwise a constant, infuriating and inexplicable experience for the motorist. Proceeding at a normal rate along a thoroughfare, he will find either that a Chinese darts suddenly and without warning across the bows of the car, or that one, already crossing briskly at a safe distance, will suddenly slow down to a crawl so as to make an interception and collision almost inevitable. The motorist brakes, swerves, hoots and swears. The Chinese turns and favours him with a large, benevolent and delighted grin. The motorist is baffled, until he appreciates the reason for his delight: however narrow the shave for the pedestrian, that for his personal devil following in his footsteps must have been even closer. The latter, in fact, has probably been severely shaken, perhaps even had to leap precipitately to safety, and consequently has lost face, will be in chastened mood, and is unlikely to be his usual obstreperous and malevolent self for quite a time. Thus the relieved and temporarily exorcized Chinese is very grateful to the motorist; the startled motorist perhaps less so to the Chinese.

The third phenomenon is the Gregarious Learner. He is not identifiable by race, being encountered in Chinese, Indian and Malay guise, though perhaps most commonly in the last named. The learner-driver is a familiar spectacle at home, distinguishable, apart from the red "L" plates fore and aft, by a harassed expression, normally shared by his preceptor and a conspicuous conscientiousness in the use of hand signals. His counterpart in Singapore also has the "L" plates on his Morris Minor (for no establishable reason all learners in Singapore drive Morris Minors), and the harassed expression, but there the resemblance ceases. The instructor shares the front seat, but his attitude is one of cheerful nonchalance; if his pupil is female, his interest and proximity may well be closer, and at least one exponent of the "on the lap" school of instruction has been observed. The greatest difference, however, appears in the attitude of the learner's family. At home they wave him farewell from the front door with a mixture of facetious comment and anxious admonition, and return to their armchairs in the expectation, or at least hope, of his eventual return. In Singapore, such an attitude would be condemned as unsympathetic and disinterested. The entire family, normally numbering between six and twelve, accompany the learner on his maiden progress, piled up on the back seat like chairs stacked in a canteen and all deriving immense enjoyment from the trip. This enjoyment is evinced by happy smiles, gay cries and chatter, words of encouragement and advice to the learner, and, above all, by hand waving.

Natural ebullience and fantastic overcrowding result in arms appearing from every window, the whole appearance of the equipage resembling one of those multi-limbed deities in Hindu circles. The intentions of the driver, as indicated by his hand signals, which are in any case normally duplicated, contradicted or overridden by those of his instructor through the other side window, are thus completely and indistinguishably swamped in a sea of manuflexion.

Prestige or "face" accounts for another experience which often befalls the wife of the Service man when she tries her novice hand at the wheel in Singapore. These ladies, when new to the colony, are constantly surprised and frightened to be serenaded by a sudden and violent blare of the horn from astern and the subsequent headlong passage of an apparently infuriated driver, oblivious of oncoming traffic, blind corners, wet roads and other hazards. The secret of this performance becomes clear if the lady concerned remembers that she has herself recently overtaken that same driver, albeit with the utmost grace and decorum. The Oriental driver, who, to give him his due, is normally no aggressive thruster or road hog, cheerfully acquiesces in being passed until he observes with horror that the overtaker is a female. Grave loss of face immediately results; his passengers, numerous and chatty as always, snigger and nudge each other and pass derogatory remarks about his determination, driving skill and even virility; unless the situation can be immediately restored and the female transgressor again overtaken, his reputation and *amour-propre* will suffer a serious and permanent setback.

Flying is another occupation beset with interest and occasional climatic hazards, though the latter are fewer than at home. The delights of flying without handicap of snow, ice (except in cumulus nimbus) or persistent fog are to some extent alloyed by the frequency of torrential storms particularly during the monsoons. These are mostly sporadic and short-lived, rarely lasting more than an hour in one place, and consequently in the past piston-engined aircraft could stand off until their airfield was clear. The short-endurance jet is less happily placed, except where diversionary airfields exist, and its pilot has to combine care with his flight-planning (though prediction of storms is difficult), skill in instrument flying, and quickness in decision. He has, however, one major compensatory consolation: of all the thousands sweltering in the Singapore heat who wish only that they could climb into a refrigerator and shut the door, he alone can make that wish come true.

It seems the one fatal mistake that the novice in the Far East can make is to close his mind, eyes and ears (though the same does not always apply to his nose) to the new sensations and experiences it has to offer. Generations of Englishmen have made just this mistake, and like so many expatriated ostriches have surrounded themselves with "little Englands" and taken pride in so doing. One of the major attractions of service life is travel and the opportunities it offers to widen one's mind and experience. Overseas tours are nowadays limited in both numbers and scope; the Far East is perhaps the last and the best of the real traditional settings for foreign service. Anyone who wastes it has only himself to blame.

"ORDER No. 3. BONFIRE NIGHT THURSDAY 5th NOVEMBER, 1953."

"A large bonfire has been organized in the square in Married Quarters for the 5th November. The fire section will be standing by with hoses in case of necessity. No other large bonfires are permitted. The Fire Officer is to ensure that the fire is not too large and does not threaten the safety of any buildings or property."

The above order promotes the thought—How large is a large bonfire and when does it become too large? How, in fact, does one measure or assess the largeness of a bon or other fire? Does the sinister reference to the fire party standing by with hoses in case of necessity give us a clue to the answer? Hardly so, for surely their role is to extinguish a fire which has already grown over-large, not to determine its largeness. No, there is evidently a technologist somewhere in the background who is a specialist at this business. Not a fire-fighter, nor a fire-ranger, nor a fire-eater, but a real Gilbert Harding line, something like "bonfire-largeness-computor and appreciator." I can imagine that to reach even the rank of Junior Technician in this trade demands a first-class education, including, as it must, the chemistry of combustion, pyrotechnics, English history, the theory of structures and the essential elements of Guyfawkery. What, I wonder, are the tools of his trade? Does he, for instance, install remotely controlled bolometers (or largeness-indicators) in the windows of married quarters and other adjacent buildings, making corrections where necessary for local disturbance such as infra-red radiation from lit-up W.Os.? Or perhaps the sheer bulk of the thing is the criterion, and measurements are made with a theodolite or by men in asbestos suits with tape measures. Is there, perhaps, a chestnut-roasting number or other non-dimensional coefficient which makes the thing so simple that we are surprised we didn't invent it ourselves?

Yet no solution seems wholly satisfactory. A fire that is large purely in the sense of bulk may be offensive but quite unmalignant (like the sodden thing at the end of our garden, smelling strongly of paraffin after many abortive attempts to encourage inflammation). Conversely there are the vicious little dramas due to over-flatulent blow-lamps where all is flame and confusion. Flame! Much flame large fire? Can that be the answer? If so how does one measure the length and thickness (if any) of a leaping, dancing dame? As you were—flame? By mirrors you say, gentle reader (if any). So, if the flames are long the fire is large. But how long is long? (Not much longer.—Editor.)

Quite! Now take my wife, for example. Or come to that anyone else's if you can get away with her. We are going out to dinner—well, all right, to the pictures. I have been waiting 7 minutes 35.421 seconds. The engine of the car is still running. I call up the stairs "How long will you be, darling?" I suspect—in fact I am dead certain of the answer. It is rather indistinct coming through a lip-stick blotter. "Not long," she says.

You see I've spent a short time over a largish subject and though we've covered quite a bit there is still a goodish way to go. Which are words without meaning but agreeable and in some way comprehensible to most of us.

H. P.

CONCERNING PERSONNEL

ROYAL AIR FORCE HONOURS, AWARDS, PROMOTIONS AND APPOINTMENTS

PROMOTIONS

To be Air Chief Marshal: Air Marshal (Acting Air Chief Marshal) Sir Basil E. Embry, K.C.B., K.B.E., D.S.O., D.F.C., A.F.C., with effect from 1st December, 1953.

Air Chief Marshal Sir Basil Embry has been Commander-in-Chief, Allied Air Forces, Central Europe, since 16th July, 1953.

APPOINTMENTS

Among the appointments announced by the Air Ministry since the issue of the January, 1954, number of this Journal are the following:

AIR MINISTRY

Air Marshal Sir D. Hardman, K.C.B., O.B.E., D.F.C., as Air Member for Supply and Organization.

Air Marshal Sir C. E. H. Guest, K.B.E., C.B., as Inspector-General, Royal Air Force.

Air Commodore G. B. Beardsworth, C.B., as Director of Air Engineering.

Air Commodore D. W. R. Ryley, C.B.E., as Director of Armament Engineering.

Air Commodore J. F. Hobler, C.B.E., as Director of Personal Services (A.).

Air Commodore A. Earle, C.B.E., as Director of Personnel (A.).

Air Commodore J. Marson, C.B., C.B.E., as Vice-President of the Ordnance Board, Ministry of Supply.

Air Commodore R. C. Storrar, O.B.E., as Director of Equipment (D.).

COASTAL COMMAND

Air Vice-Marshal G. R. Beamish, C.B., C.B.E., as Air Officer Commanding-in-Chief.

Air Commodore W. L. Freebody, C.B., C.B.E., as Senior Technical Staff Officer.

FLYING TRAINING COMMAND

Air Vice-Marshal G. E. Nicholetts, C.B., A.F.C., as Air Officer Commanding, No. 21 Group.

TECHNICAL TRAINING COMMAND

Air Vice-Marshal J. L. F. Fuller-Good, C.V.O., C.B.E., as Air Officer Commanding, No. 22 Group.

MAINTENANCE COMMAND

Air Commodore G. L. Worthington, C.B.E., as Air Officer Commanding, No. 42 Group.

90 GROUP

Air Commodore C. A. Bell, as Senior Air Staff Officer.

WASHINGTON, U.S.A.

Air Vice-Marshal R. L. R. Atcherley, C.B., C.B.E., A.F.C., as Head of Air Force Staff, British Joint Services Mission.

MOSCOW

Air Commodore P. L. Donkin, C.B.E., D.S.O., as Air Attaché.

MIDDLE EAST

Air Commodore P. Jones, C.B.E., as Chief Signals Officer.

AUSTRALIA

Air Commodore T. A. B. Parselle, C.B.E., as Commandant of the Royal Australian Air Force Staff College.

CYPRUS

Air Commodore C. D. C. Boyce, C.B., C.B.E., as Air Officer Commanding.

OBSERVER CORPS

Observer Captain C. G. Cooke, O.B.E., as Acting Area Commandant at the Eastern Area Headquarters.

Observer Captain W. Rusby, as Deputy Commandant of the Royal Observer Corps Headquarters.

GROUP CAPTAINS' APPOINTMENTS

Group Captain D. M. Strong, A.F.C., to the R.A.F. Staff College, Bracknell, for directing staff duties.

Group Captain F. S. Stapleton, D.S.O., D.F.C., to the R.A.F. Flying College, Manby, for directing staff duties.

Group Captain W. R. Brotherhood, C.B.E., to R.A.F. Lindholme, to command.

Group Captain R. J. Rackham, M.A., A.M.I.C.E., to Headquarters, No. 1 Group, for technical staff duties.

Group Captain A. V. R. Johnstone, D.F.C., to Headquarters, No. 12 Group, for air staff duties.

Group Captain J. N. W. Farmer, D.F.C., to R.A.F. Acklington, to command.

Group Captain G. P. Seymour-Price, D.F.C., to R.A.F. Moreton-in-Marsh, to command.

Group Captain T. N. Coslett, O.B.E., to Air Ministry, for duty in the department of the Air Member for Supply and Organization.

Group Captain A. Pyke, O.B.E., to Headquarters, Far East Air Force, for technical and staff duties.

Group Captain E. L. G. Le Dieu, C.B.E., to Allied Air Forces, Central Europe, for staff duties.

Group Captain T. F. Maloney, to Allied Air Forces, Central Europe, for staff duties.

Group Captain H. D. Connor, to Headquarters, No. 40 Group, for administrative staff duties.

Group Captain J. Cherrill, to Central Signals Area, to command.

Group Captain W. S. Calder, to Headquarters, No. 22 Group, for administrative staff duties.

Group Captain H. R. Withers, O.B.E., to Air Ministry, for duty in the department of the Air Member for Personnel.

Group Captain R. W. Christmas, O.B.E., to No. 32 Maintenance Unit, to command.

Group Captain H. G. Blair, to R.A.F. Watton, for technical duties.

Group Captain S. G. Morgan, to Headquarters, Fighter Command, for air staff duties.

Group Captain R. S. Sweet, O.B.E., to R.A.F. Record Office (Unit), to command.

Group Captain E. L. J. Rowe, O.B.E., to Headquarters, Far East Air Force, for air staff duties.

Group Captain A. H. Donaldson, D.S.O., D.F.C., A.F.C., to Headquarters, No. 2 Group, 2nd Tactical Air Force, as Senior Air Staff Officer.

Group Captain D. S. Wilson-MacDonald, D.S.O., A.F.C., to R.A.F. Sylt, 2nd Tactical Air Force, to command.

Group Captain C. J. Mount, D.S.O., D.F.C., to Headquarters, 2nd Tactical Air Force, as Group Captain (Plans).

Group Captain D. I. Coote, C.B.E., to Headquarters, Bomber Command, as Group Captain (Organization).

Group Captain J. G. Wigley, to Air Ministry, for duty in department of the Air Member for Personnel.

Group Captain G. C. Allen, O.B.E., to Headquarters, Maintenance Command, for air staff duties.

* * *

RETIREMENTS

Air Chief Marshal Sir J. Whitworth Jones, K.C.B., C.B.E.
Air Marshal S. C. Strafford, C.B., C.B.E., D.F.C.

* * *

NEW YEAR HONOURS

Among the names of Royal Air Force personnel in the New Year Honours List were:

K.C.B.

Air Marshal G. H. Mills, C.B., D.F.C.
Air Marshal C. B. R. Pelly, C.B., C.B.E., M.C.

C.B.

Air Marshal B. V. Reynolds, C.B.E.
Air Vice-Marshal V. S. Ewing, C.B.E., M.B., Ch.B., D.P.H.
Air Vice-Marshal J. H. Edwardes-Jones, C.B.E., D.F.C., A.F.C., B.A.
Air Commodore L. W. C. Bower, D.S.O., D.F.C.
Air Commodore H. L. Messiter.
Air Commodore F. R. D. Swaine, C.B.E., A.F.C.
Air Commodore G. N. E. Tindal-Carill-Worsley, C.B.E.
Air Commodore H. F. G. Southey.

G.B.E.

Air Chief Marshal Sir John W. Baker, K.C.B., M.C., D.F.C., A.D.C.

K.B.E.

Air Marshal C. E. N. Guest, C.B., C.B.E.
Air Marshal H. T. Lydford, C.B., C.B.E., A.F.C.

C.B.E.

Air Commodore H. Ford, A.F.C., B.A.
Air Commodore D. N. Roberts, O.B.E., A.F.C.
Air Commodore C. A. Rumball, O.B.E., M.R.C.S., F.R.C.P., D.T.M. & H., D.P.M., L.D.S., Q.H.P.
Air Commodore J. N. T. Stephenson.
Group Captain W. F. Beckwith, O.B.E., B.Sc.
Group Captain C. Crowley, M.B., B.Ch., D.P.H., D.I.H.
Group Captain K. W. Godfrey, R.A.F. Regiment.
Group Captain E. C. Kidd, O.B.E., A.F.C., A.F.M.
Group Captain L. P. Moore.

AWARDS

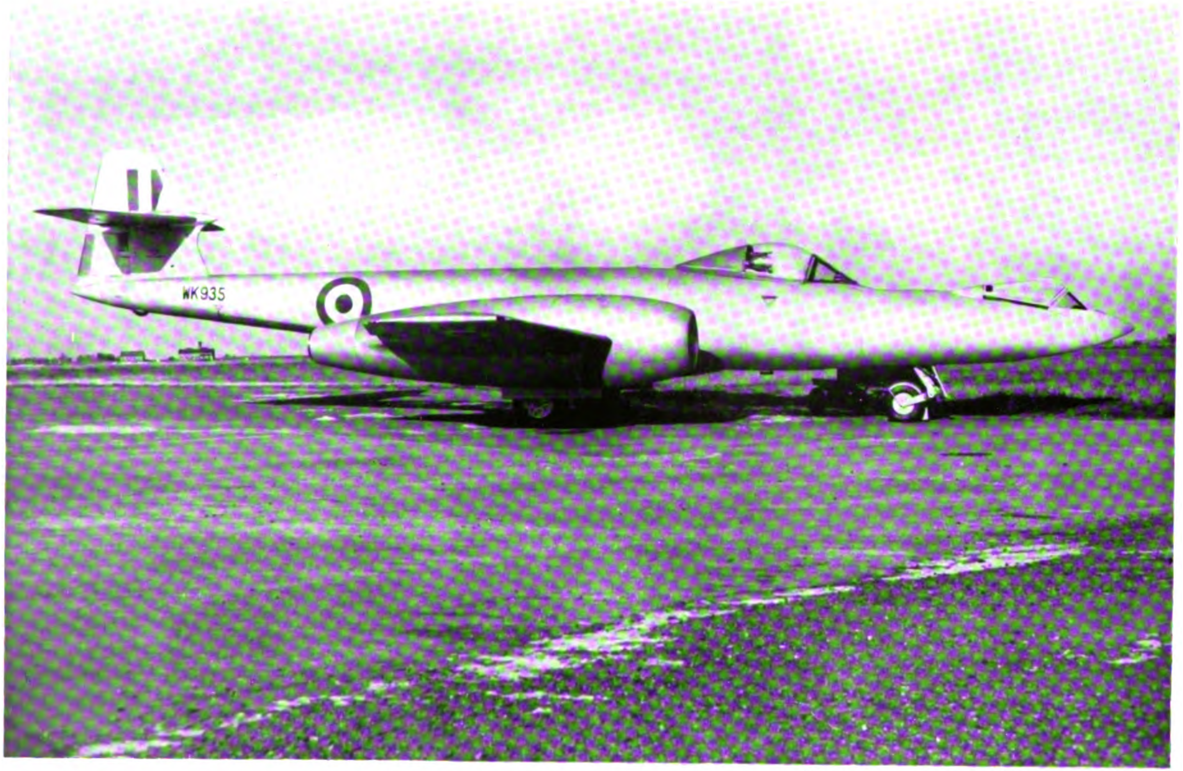
BAR TO AIR FORCE CROSS

Wing Commander E. W. Anderson, O.B.E., D.F.C., A.F.C.
Wing Commander H. H. S. Brown, A.F.C., M.B., B.S.
Squadron Leader S. Hazlewood, A.F.C.
Squadron Leader C. S. Hunton, D.F.C., A.F.C.
Squadron Leader T. Stevenson, A.F.C.
Squadron Leader H. T. Murley, D.F.C., A.F.C.
Flight Lieutenant R. L. E. Burton, A.F.C.

AIR FORCE CROSS

Group Captain D. A. Wilson, M.R.C.S., L.R.C.P., D.M.R.E., D.M.R.
Wing Commander T. Balmforth, D.S.O., D.F.C.
Wing Commander R. N. H. Courtney, D.F.C.
Wing Commander J. B. Coward.
Wing Commander G. H. Dhenin, G.M., M.B., Ch.B., L.R.C.P.
Wing Commander F. D. Hughes, D.S.O., D.F.C.
Wing Commander J. T. Shaw, D.S.O., D.F.C.
Wing Commander W. A. Smith, D.F.C.
Wing Commander C. S. G. Stanbury, D.S.O., D.F.C.
Wing Commander J. Wallace, D.S.O., D.F.C.
Acting Wing Commander M. H. Le Bas, D.S.O.
Squadron Leader E. G. Alcock.
Squadron Leader R. A. Carson, M.C.
Squadron Leader P. H. Cleaver, D.F.C.
Squadron Leader C. W. Coulthard.
Squadron Leader I. D. Crozier.
Squadron Leader J. F. J. Dewhurst, D.F.C.
Squadron Leader D. S. Dickins.
Squadron Leader P. E. Vaughan-Fowler, D.S.O., D.F.C.
Squadron Leader W. R. Gellatly.
Squadron Leader A. Hudson, D.F.C., Royal Auxiliary Air Force.
Squadron Leader W. N. Kenyon.
Squadron Leader D. C. H. Simmons.
Squadron Leader F. B. Sowrey.
Acting Squadron Leader B. Beard.
Acting Squadron Leader D. W. Butler.
Acting Squadron Leader D. de Villiers, Royal Auxiliary Air Force.
Acting Squadron Leader R. F. Hitchcock.

Acting Squadron Leader K. H. Perry, D.S.O.
Acting Squadron Leader J. H. Rogers.
Acting Squadron Leader R. J. S. Spooner.
Flight Lieutenant R. A. E. Allen.
Flight Lieutenant C. G. Bailey.
Flight Lieutenant D. S. Bell, D.F.C.
Flight Lieutenant B. Burton.
Flight Lieutenant E. S. Chandler.
Flight Lieutenant J. Corbishley.
Flight Lieutenant J. McR. Cormack, Royal Auxiliary Air Force.
Flight Lieutenant E. A. J. Crooks.
Flight Lieutenant T. W. F. de Sallis.
Flight Lieutenant D. H. Gannon, D.F.C.
Flight Lieutenant V. G. Gibbard, R.A.F. (retd.).
Flight Lieutenant W. N. Gilmer.
Flight Lieutenant N. F. Harrison, D.S.O.
Flight Lieutenant L. G. Holden.
Flight Lieutenant E. E. Hopkins.
Flight Lieutenant R. G. Iles.
Flight Lieutenant W. D. Jarvis.
Flight Lieutenant D. McIntosh, Royal Auxiliary Air Force.
Flight Lieutenant A. B. Mercer, Royal Auxiliary Air Force. (Now deceased.)
Flight Lieutenant J. S. J. Hamilton-Martin.
Flight Lieutenant R. C. Norris.
Flight Lieutenant P. E. Pullan.
Flight Lieutenant R. S. Riches.
Flight Lieutenant N. F. Robinson.
Flight Lieutenant D. W. H. Smith.
Flight Lieutenant F. A. Thomas, D.F.C.
Flight Lieutenant G. A. J. Wood, D.F.C.
Flying Officer A. J. Camp.



[Copyright: Armstrong-Whitworth Aircraft Ltd.

Here is the first photograph of the "Prone Pilot Meteor," Britain's latest experimental aircraft which will be used for tests regarding piloting a plane while lying prone. It flew for the first time on **10th February, 1954** ***from Baginton.***

CURRENT EVENTS

R.A.F. Far East Transport Wing's Achievements

In twelve months of concentrated passenger flying over Asian seas and lands, R.A.F. Valetta aircraft of the Far East Transport Wing have flown two million miles without incident.

Outstanding among these flights were those operated at short notice under the code name "Prideair." The need arose from the signing of the Korean armistice and the sudden ordering to Bombay of the trooper *Empire Pride*, then in Singapore with 2,000 Service men bound for Hong Kong, to pick up the Indian truce troops. The problem posed by the stranded Service men was quickly solved by the Far East Transport Wing and, despite typhoons along the route and bad weather at Hong Kong, the entire 2,000 were flown to Kai Tak, the R.A.F. airfield at Hong Kong, within a few days. Then the Wing went a stage farther and air-lifted a large number of repatriated prisoners of war from Hong Kong to Singapore and enabled them to catch the troopship *Asturias*, thus reaching their homes in the United Kingdom far quicker than at first seemed possible.

Passenger flying is only one aspect of the Wing's activities. During the past year its aircraft carried a diversity of freight, ranging from oxygen used by Sir Edmund Hillary and Sherpa Tensing in their successful attempt on Mount Everest—transported in a reinforcement aircraft—to the thirty-five tons of supplies flown to the R.A.F. Staging Post on the Cocos Islands, in the centre of the Indian Ocean, in preparation for the London-Christchurch Air Race in October. In addition, many special flights were undertaken by the Far East Communication Squadron, using their York, Hastings, Valetta and Devon aircraft.

Of primary importance was the Wing's supply dropping commitment by its detachments at Kuala Lumpur. Despite the difficulties of flying over extremely rugged country often with a low cloud ceiling, or through heavy tropical rainstorms, every day without fail the Wing's Valettas from this airfield in Central Malaya have kept the Security Forces fighting in the jungle supplied by "parachute mail" with rations, mail and other items urgently required. Surface communications in the undeveloped jungle areas of Malaya are for the most part non-existent and, without adequate air supply, Security Force patrols are unable to remain harrying the terrorist gangs for any period of time.

There was hardly a limit to the range of items dropped by the Valettas and their aircrews with the aid of the Army despatchers of the R.A.S.C. Chairs for the occupants of police posts, livestock, including hens to maintain a fresh egg supply, cats to check a plague of rats, and goats to ensure fresh milk, rations—suitably packed according to the nationality of the unit for which it was destined—ammunition, medical stores, were among the cargoes dispatched.

Operations with airborne forces is another regular task of the Wing which last year provided aircraft for the basic training of paratroops involving over three thousand descents, apart from flying several operational flights during which paratroops were dropped into action against terrorist gangs. The Wing's aircraft have also played a prominent part in bringing psychological warfare to the jungle with the aid of special amplifying equipment which enables trained experts to talk to terrorists from the air. Numbers have surrendered as a result of this treatment.

It remained in the "Information Tray"

Hanging in the entrance hall in the Officers' Mess at R.A.F. Station, Yatesbury, Wiltshire, is an aerial photograph of the camp. Such photographs are often to be found at R.A.F. stations, but the one at Yatesbury tells an interesting story, for it was taken by a German photographic reconnaissance aircraft during the war.

A Wiltshire man, proprietor of a garage near Yatesbury, who served in the R.A.F. during the war, found the photograph on a captured German airfield at the end of the war, and, as it was of particular interest to him, brought it back to England. Later Flight Lieutenant G. W. Edmonds, the Station Physical Fitness Officer and a former air gunner, called at the garage for petrol, was shown the photograph and asked whether it would be of interest to the station.

Presented to the Officers' Mess by Flight Lieutenant Edmonds and framed, the photograph has many printed notes made by German Intelligence Officers. That Yatesbury was not bombed during the war is recorded by the caption to the photograph—"Fortunately, it remained in the 'information tray' and not the 'action tray'."

Handling Squadron Visit to Far East

A team from the R.A.F. Handling Squadron visited units of the Far East Air Force, leaving R.A.F. Station, Manby, Lincolnshire, on Thursday, 4th February and returning on 26th February.

The Handling Squadron, in collaboration with the Ministry of Supply, is responsible for the preparation of pilots' notes describing the handling characteristics of all types of aircraft as they come into R.A.F. service. It also keeps pilots' notes up to date, making changes which may be necessary as more experience is gained with the aircraft in service, and as new factors arise, such as modifications or changes in characteristic for any other reason. Regular visits are made to squadrons at home and overseas to discuss aircraft handling questions with the squadron pilots, and any recommendations or suggestions by the "users" are carefully noted. Each aircraft type in current use is reviewed once a year from the handling viewpoint.

For the Far East tour, the Handling Squadron team flew in a Varsity aircraft, captained by Squadron Leader I. D. Roxburgh, A.F.M. (Officer Commanding the Handling Squadron). R.A.F. units in Ceylon, Singapore and Hong Kong were visited.

R.A.F. and R.N.Z.A.F. Auxiliary Squadrons to be Affiliated

The four Territorial Squadrons of the Royal New Zealand Air Force are now affiliated with squadrons of the Royal Auxiliary Air Force as follows:

No. 1 Auckland (T.) Squadron with No. 600 (City of London) Squadron.
No. 2 Wellington (T.) Squadron with No. 601 (County of London) Squadron.
No. 3 Canterbury (T.) Squadron with No. 610 (County of Chester) Squadron.
No. 4 Otago (T.) Squadron with No. 603 (City of Edinburgh) Squadron.

The purpose of this arrangement is to foster a close relationship between the affiliated squadrons by a regular exchange of information about training and social activities and by the extension of hospitality to members visiting each other's country. These arrangements strengthen the bonds which unite the Air Forces of the Commonwealth.

The New Zealand Territorial Squadrons were originally formed in 1931. At the outbreak of war they were mobilized for general reconnaissance duties in

New Zealand waters, and later they were absorbed in the regular squadron and served in the South Pacific area. They were re-formed on a Territorial basis in 1948.

Three of the R.Aux.A.F. Squadrons which are concerned were formed in 1925; No. 610 Squadron was formed in 1936. They were embodied for active service when war began and served in many theatres until 1946 when they were reconstituted on a peace-time basis.

PRINCESS MARGARET PRESENTS SQUADRON STANDARD

No. 605 (County of Warwick) Squadron, to which in March Princess Margaret presented a Squadron Standard at its base, R.A.F. Station, Honily, near Kenilworth, is one of the earliest squadrons of the Royal Auxiliary Air Force, and was the first to receive jet aircraft following the decision to re-equip all such squadrons with jet fighters.

No. 605 Squadron received notice that the Queen had approved the award of the Standard towards the end of last year. Given in recognition of twenty-five years' or more total service on 1st April, 1953, the Squadron has chosen the following battle honours for commemoration on the scrolls of its Standard: "Dunkirk, Battle of Britain, 1940"; "Malta, 1941"; "Eastern Waters, 1942"; "Fortress Europe, 1942/45"; "Home Defence, 1944"; "France and Germany, 1944/45."

* * *

THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS (NEWS ITEMS)

Piloting a Pilotless Missile

The complicated series of electronic and radio aids which form the "brains" of guided missiles now under development would not be worth much if they were not cleverly linked to the controls of the missile so that their instructions effectively manœuvred the weapon on to its target.

However, these controls are rather different from those at present fitted to most piloted aircraft—they have to be because the missile attains supersonic speed within one or two seconds of the time it is launched, and stays supersonic throughout its life in the air. The control and lifting surfaces are usually sharp edged and razor thin, and quite small surfaces can produce large forces which enable the weapons to manœuvre at seven to twenty "g"—well beyond the capabilities of piloted aircraft.

Cartesian Control

There are two main methods of control. One is called the Cartesian method, the other polar control.

Missiles guided by the Cartesian method have two sets of "wings" fitted at right-angles to each other—that is, four wings forming a cross round the fuselage. Movable control surfaces are fitted to the wings. The missile is kept in level flight by gyros.

If the guidance system requires the missile to turn to the left or the right, the vertical control surfaces are operated, as rudders are operated on a conventional aircraft. If the guidance system requires the missile to go up or down, the horizontal surfaces are moved.

When the missile is required to make a climbing or diving turn to reach the target, the combined use of all four controls wrench the missile round in a skidding turn in the direction of its objective—quite unlike the operation of a piloted aircraft, which, when turning, must first be rolled in the direction of the turn.

Polar Control

Missiles using the second method of control, the so-called polar system, have a configuration more like that of a conventional aircraft. They have only two wings, with one pair of controls arranged to work in opposite directions like ailerons and another set working together like elevators in the conventional aircraft.

Flight is again stabilized by gyros. The receiver in the missile controls its movement by measuring the angle between the target-response and the line of flight of the missile, and the range of the target. The missile is then rolled until its wings are at right-angles to the plane of the missile and the target. The elevators then pull the nose up or down until it is pointing directly at its objective.

In other words, the weapon is first rolled or twisted into an appropriate position and then steered to its target (it is sometimes called "twist and steer" control), a rapid and accurate method similar to that used by a pilot in any conventional aeroplane.

Missiles using the polar method of control sometimes spiral as they get close to their target.

In the simplest missiles, the wings are "all moving" so that they combine the functions of the lift-producing surfaces with the controls.

The mechanism which connects the "brain" of the missile to the control system is similar to that used in aircraft auto-pilots. But, of course, the missile's system has to be much more compact than that used in a piloted aircraft and capable of standing much higher "g" forces.

1954 S.B.A.C. Display Announced

The Society of British Aircraft Constructors announces that the 1954 S.B.A.C. Flying Display and Exhibition will be held from Tuesday, 7th September, to Sunday, 12th September, inclusive. There will be a Technicians' Preview on Monday, 6th September. The display will be held at Farnborough, Hampshire.

British Light-weight Fighter considered for Army Troop-support Work

Great Britain's light-weight jet fighter, the Folland Gnat, is arousing considerable interest as a ground-attack and troop-support fighter with N.A.T.O. forces. The small plane is being carefully considered by some N.A.T.O. air forces not only because it is cheaper and easier to build than larger machines, but because it is expected to be able to operate from exceptionally short temporary runways in forward battle areas, carrying a powerful load of guns or rockets.

Hitherto the Gnat has been thought of mainly as an interceptor. It is expected to have the speed and rate of climb of conventional fighters, and though it will have fewer instruments and armament, it will carry all the essentials of the high-speed fighter—radar ranging for the guns, cannons, V.H.F. radio, armour, ejection seat, etc. It will have conventional take-off and landing characteristics.

The Gnat will be somewhat smaller in size and about the same weight as the Battle of Britain Spitfire. Its wing-span is 20 ft. and its length 29 ft., as compared with 37 ft. and 42 ft. for a standard fighter now in service. Its loaded weight is expected to be about 6,000 lb., as against 17,000 lb. or more for a larger machine. The estimated price when the Gnat is in large-scale production is £25,000 each, fully equipped.

Two New British Sailplanes to Fly

Three British sailplanes will be flown by the British team in the World Gliding Championships which are to be held in Derbyshire, England, this summer. Two are new designs. The third is the type which won the world championships held in Spain in 1953.

One of the new sailplanes has been designed by Hugh Kendal, and is to make its first flight shortly, piloted by the designer. It is a single-seater. The fuselage was built by Miles Aircraft and the wings by Elliotts of Newbury.

The new Slingsby sailplane which it is hoped will be ready in time for the championships is the T-34, a two-seat trainer. It is not designed primarily for competitions but for training in cross-country and cloud flying. The T-34 has slightly swept-forward wings but the sweep is hardly noticeable. The forward part of the fuselage is made of laminated plastic.

Plastic is also used for certain parts of the skin of the Slingsby Sky, the third sailplane to be flown by the British team, and the design which won the world championships last year. Several competitors from other countries will also be flying Sky sailplanes.

* * *

FROM AMERICAN SOURCES

JET-TO-JET AERIAL REFUELING

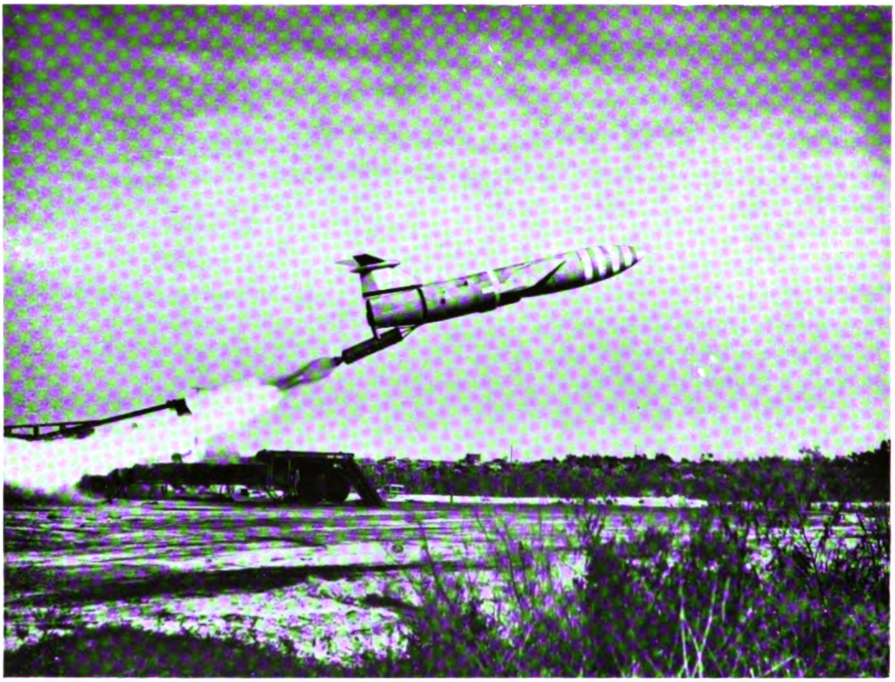
Aerial refueling has been described as one of the most significant advances in recent aviation. It progressed another important step forward when a specially fitted Boeing B-47 bomber made the world's first jet-to-jet transfer of fuel aloft —refueling first a jet fighter and later a companion B-47 Stratojet.

The modified Stratojet that acts as tanker in this continuing test programme is a 10-mile-a-minute medium bomber fitted with fuel tanks, high-pressure pumps and lines. Designated the KB-47, it is demonstrating the practicability of aerial refueling at the extreme altitudes and high speeds at which modern jet aircraft normally operate.

While Boeing's piston-powered KC-97, the standard Air Force tanker, is admirably suited to the needs of today and the immediate future, tests with the experimental KB-47 prove the feasibility of transferring fuel at jet speeds. These tests also pave the way for the development of a jet-powered tanker large enough to carry ample cargoes of fuel, and fast enough to deliver it aloft to jet fighters and jet bombers at the speeds and altitudes at which they function most efficiently

Such a jet-powered tanker would be capable of accompanying jet aircraft on their missions, and refuelling them by one of several proved methods without the necessity of cutting back to lower speeds and dropping down to lower altitudes.

Recognizing the coming need for an advanced jet tanker, Boeing is now constructing a prototype aircraft designed to be adaptable for either military or commercial use.



[*Photo: The Glenn L. Martin Company*

B-61 *MATADOR*

The pilotless bomber being launched at the Air Force Missile Test Center, Cocoa, Florida.

PILOTLESS BOMBER SQUADRONS FOR WEST GERMANY

THE B-61 Martin Matador, the U.S. Air Force's first successful ground-to-ground tactical weapon, will be the weapon used by the first pilotless bomber squadrons ever to be deployed to foreign soil. The U.S.A.F. has just announced that two squadrons which have been in training at Cocoa will be shipped this year to Germany as a part of the N.A.T.O. defence, adding a new weapon against the threat of Communist attack.

The Matador, developed and manufactured by the Glenn L. Martin Company, is launched from a highly mobile roadable platform. No permanent installations or runways are required. A booster rocket adds its thrust to that of a turbojet engine to get the Matador airborne within its own length, then drops off when expended. In flight, the Matador is tracked and guided by radar from ground stations until it is directly over the target.

Closely resembling today's high-speed jet fighter planes, the Matador's speed is comparable with the piloted aircraft, although no specific performance data have been released by the Air Force.

"FLYING SAUCERS"

United States Air Force "flying saucer" investigation will be aided by use of *diffraction grating cameras* which are being distributed to about *sixty* control towers and *fifteen* air defence sites throughout the United States. These "Videon" cameras are expected to reveal much about chemical composition of unidentified flying objects. Continuing investigation of "flying saucers" by Air Technical Intelligence Center has not changed earlier Air Force conclusions. The Air Force denies that it withholds important information on saucer sightings.

NEW PILOTLESS BOMBER FOR U.S.A.F.

The Snark XB-62, new pilotless bomber of the U.S.A.F., is a deadly team-mate for the long-range Northrop Scorpion F-89, all-weather interceptor. Details of the Snark are still secret.

GUIDED MISSILES FROM SUBMARINES

The United States Navy has a guided missile, the Regulus, which has a range of 500 miles and can be launched from a submarine.

DOUGLAS RB66A

Built to perform in the stratosphere, or to scrape treetops in low-level missions, the new United States Air Force RB66A will be one of the most versatile photo-reconnaissance planes ever designed.

Complete performance data must still remain secret, but the Air Force permits release of the information that the Douglas RB66A will be in the 600 to 700 m.p.h. class—with range enough to fly deep into enemy territory, and return. Powered by twin jets, slung in pods below the wing outboard of the fuselage, RB66A will carry the most modern photographic equipment, for accurate reports on operations.

[Photo: Sport and General

THE ROYAL AIR FORCE XV WHICH DEFEATED THE ROYAL NAVY

Standing—Referee H. B. Elliott, W./Cdr. N. Cameron (Hon. Sec.), F./Officer T. Bleasdale, F./Officer J. Boothman, P./Officer C. David, F./Officer G. J. A. Head, A./C. J. Sewell, F./Officer D. G. Naylor, F./Lieut. T. R. Beatson, A./C. M. U. Hughes, S./Ldr. H. K. Rees (Linesman).
Sitting—F./Officer N. R. Channer, S./Ldr. A. A. Smailes, F./Lieut. R. V. Stirling, F./Lieut. P. G. Yarranton, F./Lieut. G. Rowlands.
On Ground—F./Lieut. A. W. Black, S.A.C. Barter.

ROYAL AIR FORCE RUGBY UNION

By Wing Commander Neil Cameron, D.S.O., D.F.C.

THE Royal Air Force rugby representative XV completed the first part of their programme on Saturday, 20th February, by defeating the Royal Navy by three tries, one penalty goal to one penalty goal and a try—12 points to 6. This was our first victory against the Navy since 1949 and only our seventh win against them since the series of inter-Service fixtures started in 1921.

The Royal Navy are always a difficult side to beat. They play a traditionally hard, robust bustling game and they are always likely to knock a good side off balance by their dash and fire. Indeed this was what happened in the early part of this game and Lieutenant J. P. England and his Navy forwards were so active in the loose that the R.A.F. backs could not get into their stride. At half-time the score was 6 points to 3 in favour of the Navy. After the interval the R.A.F. forwards set about their opponents to good purpose and as the ball was coming back cleanly and rapidly from the tight scrums the R.A.F. backs got ample chances for attack. They looked dangerous and it was only a matter of time before the R.A.F. took the lead from a penalty goal kicked by Flight Lieutenant G. Rowlands, the Welsh International wing three-quarter, and then a try scored by Senior Aircraftman Alan Barter, a National Service man stationed at Innsworth. More sustained pressure brought another try, this time scored by Flying Officer T. Bleasdale, of Halton. It was a good try, backs and forwards handling before Bleasdale got the touch-down. That was the end of the scoring and the R.A.F. side managed to hold their tiring opponents until the final whistle.

It was an encouraging win. Because of the period of severe weather the side has had little chance to get together and to get to know each other's playing. Three of the proving fixtures had to be cancelled because of frost and International and Combined Services calls on our playing strength have made it impossible to get all our available talent on the field at the same time. However, the first hurdle has been successfully negotiated and we now have a chance to consolidate and get the side playing together as a team. The main part of the International season is over and we have matches to play against Coventry, Oxford University, Bedford, Gloucester, Civil Service and Richmond before we meet the Army on 27th March at Twickenham. It is hoped, therefore, that from now on the selection committee will have to make as few changes as possible and that the side which will face the Army will get ample opportunity for team practice. All the sides we have yet to play will give our XV a severe test and this will be invaluable practice for the Army match.

So far it has been a great year for R.A.F. rugby. Flight Lieutenant Bob Stirling has led England in all Internationals and he has been partnered in the English pack by Flight Lieutenant P. G. Yarranton. Stirling has also captained the Combined Services and his county. Flight Lieutenant Gwyn Rowlands has played for Wales on two occasions and he has twice been a member of a side which has defeated the All Blacks. Flying Officer Rhys Williams was selected to play for Wales in the match with Scotland. This match was cancelled during the period of frost, but it is hoped that Williams will again be selected when the fixture is played in April. Several of our players have been reserves for their respective countries and many have had county honours.

The inter-station competitions are being carried out with the usual enthusiasm and good-natured ferocity. R.A.F. Uxbridge play Bircham Newton, and Aldergrove play Pembrey in the semi-final of the Inter-Unit Shield Competition. The usual "big guns" have reached the quarter-finals of the Cup Competition but it is refreshing to see one or two new names reach this stage, notably Cluntoe, Upwood and Ternhill. The other stations still competing in this competition are Yatesbury, St. Athan, Innsworth, Full Sutton and Syerston, and we can be assured of the usual hard-fought final match in April.

To return to the representative field. We have not won the Inter-Service Championship since 1947, but we have a great chance this year after this convincing win against the Navy. Flight Lieutenant Stirling, by his vast experience and aggressive approach, is setting the side a fine example and more team practice will certainly turn our representative XV into a formidable combination. It is the aim of the team to play attractive attacking rugby in an attempt to keep the inter-Service fixtures from becoming dour slogging matches as has been the custom in the past. Rugby football is after all an attacking game, and that is how we want it played throughout the Royal Air Force at all levels.

ROYAL AIR FORCE BADMINTON ASSOCIATION

ONCE again Royal Air Force Station, St. Athan, with its six very good courts, provided the venue for the Individual Championships of the Royal Air Force Badminton Association, and some 280 competitors assembled there from 16th to 20th November. There were 492 entries for the various events, and this number does not include those who were automatically entered in the three plate events. Considering that there was some 130 men in their Singles Plate and some seventy-six pairs in the R.A.F. Doubles Plate, it is not surprising to record that play started at 9.30 a.m. and continued each day, with the exception of the Friday, until approaching 10 p.m. (then the Committee started work on the following day's play!).

It is considered that the over-all standard of play was once again on a slightly higher level than that of last year. The top standard, too, was probably on a higher plane, though the main function of the Association is to encourage the "middle-men," to give them experience of tournament conditions and play against stronger opposition. It can hardly be refuted that in probably no other tournament does the not-so-good player get so much practice and experience. Similarly the good player, though not meeting opponents of the calibre to be found in other tournaments, can find plenty of opportunity for improving his play and by no means does he have an easy tournament. Stamina is as essential for him, particularly towards the end of the week, and only if that is improved then badminton in the Royal Air Force can be said to have helped the coming County prospect. (Counties, please note!)

As was expected Corporal John Shaw proved to be too strong for all comers in the R.A.F. Singles, though Senior Aircraftman Ken Carpenter gave him a good run for his money in the semi-finals, and Corporal Ron Lockwood proved a worthy opponent in the final. In fact, when Lockwood was winning 7—0 in the first game all began to wonder what the result would be. John finally came through by 18—14, 15—6.

In the R.A.F. Doubles the two singles finalists again opposed each other—Shaw partnered by Aircraftman Turner and Lockwood by Carpenter. This, too, was a stirring game and Shaw and Turner managed to clinch it 15—5, 14—8, 15—4.

One of the most popular events is the Station Pairs Competition, for here the good player is usually partnered by someone not so good. It is always good for the game when Aircraftman "Snooks" can say that he and his partner beat say, Shaw and his partner, and "Shaw has played for England, too"! The final this year was between a pair from R.A.F. Yatesbury in Wiltshire (Ciniglio and Kniveton) and a pair from R.A.F. Leconfield in Yorkshire (Payne and Warwick). Yatesbury were fighting to keep the cup and managed to do so by winning 15—11, 15—2.

It is pleasing to be able to say that many more W.R.A.F. entered the tournament than in any previous year. The hard-working W.R.A.F. Match Secretary is mainly responsible for this, and though their standard of play has not greatly improved over the years the keenness of the girls has gone up immeasurably. That surely should be an indication that it will not be long before the standard of play, too, begins to creep upward.

Sergeant Wyatt, of the W.R.A.F., proved to be almost invincible as she managed to accumulate three titles—the Singles, and the Doubles and Station Pairs in company with Sergeant Ring. In the Singles she had a resounding victory over her Match Secretary, Flight Officer Nancy Fernihough by 11—1, 11—1, and in the Doubles with Sergeant Ring she again obtained the better of Nancy Fernihough, with Flight Sergeant Stuckey, by 15—9, 7—15, 15—4. In the W.R.A.F. Station Pairs these two from Halton again won by beating Sergeant Bogue and Corporal Parkes, of Wilmslow, 15—7, 18—17.

In the Mixed Doubles all the W.R.A.F., willy-nilly, were given partners even though a good many had never played in such an event before. Consequently, much recrimination ensued when the men pushed their partners up to the net with orders to stay there! The final was between Carpenter and Stuckey and Ciniglio and Fernihough. The latter collected her third runners-up spoon when with her partner she was beaten 15—10, 8—15, 15—7.

In all, a wonderful week was enjoyed by both Committee and competitors. After the finals, four of which were played on the Friday evening, the others having been played that morning, the trophies and prizes were presented by Mrs. Baker-Carr, wife of the Air Officer Commanding St. Athan.

Full results:

R.A.F. Singles.—Shaw beat Lockwood, 18—4, 15—6.

W.R.A.F. Singles.—Wyatt beat Fernihough, 11—1, 11—1.

R.A.F. Doubles.—Shaw and Turner beat Lockwood and Carpenter, 15—5, 14—18, 15—4.

W.R.A.F. Doubles.—Wyatt and Ring beat Fernihough and Stuckey, 15—9, 7—15, 15—4.

Mixed Doubles.—Carpenter and Stuckey beat Ciniglio and Fernihough, 15—10, 8—15, 15—7.

W.R.A.F. Station Pairs.—Wyatt and Ring beat Bogue and Parkes, 15—7, 18—17.

R.A.F. Singles Plate.—McEwan beat Irvine, 15—3, 15—3.

W.R.A.F. Singles Plate.—Stuckey beat Moyes, 11—8, 11—9.

R.A.F. Doubles Plate.—Lowrie and Boardman beat Agutter and Stevenson, 11—15, 15—8, 15—5.

At the conclusion of the Individual Championships the R.A.F. second team played a match against South Wales men, and the W.R.A.F. team engaged in battle with the ladies of South Wales, both matches being played on the six courts of R.A.F. St. Athan on 21st November, 1953. The R.A.F. won their match by twelve rubbers to one, but the girls went down to South Wales by six games to three. Both matches were very good, and the men had a tougher fight than the score suggests. A return fixture for both teams has been arranged to coincide with the Inter-Command Championship now being held on 1st, 2nd and 3rd March, again at R.A.F. St. Athan.

R.A.F. Horsham St. Faith were hosts to the R.A.F. team on 18th December, and provided the transport the following day to the Drill Hall in Norwich where the R.A.F. second team played a match against Norfolk County. Once again the R.A.F. finished the victors by nine matches to four, but Norfolk's first pair proved to be invincible and won three of the County's four matches.

Full results were (R.A.F. names first):

Boardman and Lowie lost to Bate and Havers, 5—15, 7—15; beat Hammond and Youngs, 17—15, 15—7; beat Bullent and Thompson, 15—12, 18—13.

Payne and Warwick lost to Bate and Havers, 15—7, 11—15, 9—15; beat Hammond and Youngs, 15—11, 15—2; beat Bullent and Thompson, 15—9, 15—3.

Kniveton and Landrey lost to Bate and Havers, 11—15, 6—15; beat Hammond and Youngs, 15—8, 15—5; beat Bullent and Thompson, 15—10, 15—11.

Stevenson beat Hill, 15—2, 15—0; beat Daines, 6—15, 15—5, 15—10.

Sliney beat Hill, 15—6, 15—7; lost to Daines, 15—8, 4—15, 10—15.

R.A.F. Sandwich were hosts to the men of the R.A.F. first team when they took part in the Kent Open Championships, held on 22nd and 23rd January. This was the first occasion that the R.A.F. had, *en masse*, invaded a civilian tournament and they were very well received by players and officials alike. Much light-hearted badinage took place as a result of headlines in Kent newspapers, "R.A.F. Out To Win Kent Titles." The team showed up quite well—two players (Sergeant Warwick and Corporal Lockwood) reached the semi-finals of the Open Singles, and one (Leading Aircraftman Kniveton) the semi-finals of the handicap mixed event. Aircraftman Ciniglio and Leading Aircraftman Kniveton also managed to collect games off two English Internationals (Best and Wingfield respectively) in the open mixed event. This sortie into "civilian life" proved to be very popular and certainly "advertised" the Royal Air Force to the many youngsters playing or watching.

As already mentioned, the Inter-Command Tournament is now to take place on 1st, 2nd and 3rd March at R.A.F. St. Athan. This change of date was forced upon the Association because of the School of Physical Training's movement to St. Athan from Cosford. At the moment Commands are busy sorting out their teams for this annual knock-out event and it is hoped that Technical Training Command will be given a much harder struggle to victory than last season. A report will be published in the next issue of AIR POWER.

The inter-station competitions are progressing well; both the R.A.F. and W.R.A.F. are down to the last eight at the time of writing. It is hoped to stage the semi-finals on "neutral" stations and so encourage the game. A census of stations shows that many are doing their best to improve playing conditions and there is no doubt that badminton is fast becoming one of the most popular games in the Royal Air Force. This is an extremely good sign for not only does the game encourage the individual to fight for his own honour but also for the honour of his team.

C. J. LANDREY, *Squadron Leader,*
Hon. Secretary, R.A.F. Badminton Association.

CRICKET
IN THE ROYAL AIR FORCE

BY SQUADRON LEADER L. H. CLINT, R.A.F.
Hon. Secretary, Royal Air Force Cricket Association

PROGRAMME AND PROSPECTS FOR 1954

ONE of the nicest things about cricket is the feeling of pleasurable anticipation experienced by even the most hardened old veteran in the weeks immediately preceding each new season.

At this time of the year, your cricketer is an incurable optimist—the summer is going to be perfect, he feels full of runs, and wickets galore are his for the taking. Later in the season it may be a different story; but for this brief spell, no cloud appears to mar his perfect sky.

Well, this year the Royal Air Force XI will start out full of hope on one of the most ambitious and attractive programmes they have ever attempted.

Encouraged by last year's successes, the list of three-day matches has been further extended, and the XI will now meet Derbyshire at Ilkeston, Northants at Northampton, Somerset at Taunton, Kent at Folkestone and Worcestershire at Worcester.

. In addition, two-day games have been arranged against the Free Foresters at R.A.F. Halton, the Civil Service at Chiswick, Colonel L. C. Stevens's XI at the Saffrons, Eastbourne, and Devon at Torquay.

The season ends with the usual inter-Service championship matches against the Royal Navy at R.A.F. Halton, and against the Army at Lord's.

Now, what sort of a team is the Royal Air Force likely to have this year? Six old caps are no longer available, and quite a number of newcomers are likely to be introduced into the side.

Amongst those who have returned to civilian life is that very promising bat J. S. Pressdee (Glamorgan) and fast bowlers F. S. Trueman (Yorkshire and England) and R. G. Thompson (Warwickshire).

On the credit side, however, is the good news that Squadron Leader A. C. Shirreff is again likely to be available to lead the side. Shirreff's value to the XI cannot be over-estimated, and there is no doubt that by his tactical ability and inspiration he caused last year's team to play well above themselves throughout the season and to win matches that otherwise might have been drawn or even lost.

Other old caps who are still available include Squadron Leader R. G. Wilson, whose hundred against Northants was an outstanding feature of last year's batting, Flight Lieutenant R. Leggett, hard-hitter and brilliant field, Flight Lieutenant M. D. Fenner, wicket-keeper and left-hand bat, A.C. M. J. Horton, Worcestershire bat and off-spin bowler who is now at R.A.F. Pershore, and A.C. D. J. Smith (R.A.F. Warton), Central Lancashire League and Cheshire seam bowler.

The Royal Air Force representative trials will be held at Henlow on 21st and 22nd May, and until they are over it is a little hazardous to attempt to forecast the selectors' choice.

We do know, however, that fast-bowler T. A. Hall and off-spinner B. Langford, both of Somerset, are now in the Royal Air Force, and other notable youngsters who have come in since the end of last season include the Yorkshire

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MEMBERS OF THE ROYAL AIR FORCE CRICKET ASSOCIATION COMMITTEE AT LORD'S

Members of the R.A.F. Cricket Association Committee with Air Commodore H. D. Spreckley, C.B., O.B.E., Commandant of the R.A.F. Technical College, Henlow.

Left to Right: Air Commodore Spreckley, Squadron Leader L. H. Clint (Hon. Secretary), Group Captain G. N. Amison (Hon. Competition Secretary), The Rev. F. W. Cocks, M.A. (Chairman), and Group Captain R. A. Ramsay Rae, O.B.E. (R.A.F. Selector)

colt Cowan, who is well reported on as a fast bowler, and J. T. Murray, opening bat and wicket-keeper, who has had some outstanding performances with Middlesex II.

All these and many others must come into the reckoning before the XI is finally chosen. Nevertheless, it does seem that once again the Royal Air Force is likely to turn out a useful side and one which will cause the Committee to face the season with a certain amount of pious hope and restrained confidence.

In my last article, I put forward a personal opinion that, in order to produce results instead of a succession of drawn games, the inter-Service championship matches should be extended from two days to three days.

This matter was duly considered by the General Committee of the Combined Services Cricket Association at their meeting last November. Unfortunately the Navy found themselves unable to support the proposal on the grounds that, as their fixture list contained only two-day games, they were unwilling to embark on three-day championship matches without previous experience of this type of cricket. One can well sympathize with the Navy's point of view and, as complete unanimity is essential in these matters, the Committee decided to continue with the existing arrangements for the time being.

Strangely enough, two out of the three games last year did produce results. The Royal Navy beat the Army, and the Royal Air Force beat the Royal Navy.

In the final match at Lord's, however, at half-past two on the second day the Army were only 28 runs on with three wickets standing in their second innings when a sudden downpour of torrential rain brought the game to an abrupt finish. The Royal Air Force were thus robbed of the chance of an outright win in the championship—an event which rarely occurs owing to the number of drawn games.

Within the Royal Air Force, Command and Station cricket continues to flourish, and the number of units who are affiliated to the Association is steadily increasing. Last year the Inter-Command Championship was won by Flying Training Command, who beat 90 Group after a most gallant performance by the much smaller formation, who had played so well to reach the final.

One hundred and sixty-three stations and units in the United Kingdom competed in the inter-station competitions. Competition "A" was won by R.A.F. Shawbury, with R.A.F. Innsworth as runners-up. Competition "B," for smaller units, was won by R.A.F. Pembrey, with R.A.F. Feltwell as runners-up.

An innovation this season will be a new competition in the form of a plate for all first-round losers, so that in future no affiliated station will have less than two competition games in a season. There is no doubt that this should greatly add to the interest in the competitions. It will, moreover, afford some measure of consolation to those whole-hearted enthusiasts who suffer the misfortune of getting knocked out in their first match.

Granted good weather and a fair share of the toss, the stage seems set for the Royal Air Force Cricket Association to enjoy a record season.

FIXTURE LIST, 1954

5th, 6th and 7th May.—Derbyshire, at Ilkeston.
21st and 22nd May.—R.A.F. Trial, at Henlow.
26th, 27th and 28th May.—Northants, at Northampton.
5th and 6th June.—Free Foresters, at Halton.
12th, 14th and 15th June.—Kent, at Folkestone.
30th June, 1st and 2nd July.—Somerset, at Taunton.
5th and 6th July.—Civil Service, at Chiswick.
7th and 8th July.—Colonel L. C. Stevens's XI, at Eastbourne.
16th and 17th July.—Devon, at Torquay.
4th, 5th and 6th August.—Worcestershire, at Worcester.
11th and 12th August.—Royal Navy, at Halton.
14th and 16th August.—The Army, at Lord's.

[R.A.A.F. Official Photo

Flying Officer Les Reading, D.F.C., of Cunderdin, W.A., on the left, goes over preflight briefing with Pilot John Jacobs of Warwick, Queensland. Both are pilots with No. 78 Fighter Wing, Malta, and are seen here taking part in Operation "Session."

ROYAL AUSTRALIAN AIR FORCE

No. 78 FIGHTER WING'S ACTIVITIES FROM MALTA

By Flight Lieutenant Jack Cannon

Wing Public Relations Officer

WHEN No. 78 Fighter Wing of the Royal Australian Air Force went to Malta in July, 1952, to become part of the R.A.F.'s Middle East Command, an important section of Australian opinion queried the motive for sending part of our relatively small Air Force outside Australian territory.

Such a reaction was not unnatural. The Wing, an important element of the home fighter defence, was going 10,000 miles away to act as a peace-time "garrison" force. It was to leave Australia when the home strength of the R.A.A.F. already was reduced because of commitments in Korea, Japan and Malaya. Until this unprecedented movement of Australian Service men in peace time had been tested, it was difficult to convince the critics that the experiment could be justified. But now, after the Wing has been operating from the Mediterranean island for more than a year, it is possible to analyse the first session of activity and assess the results.

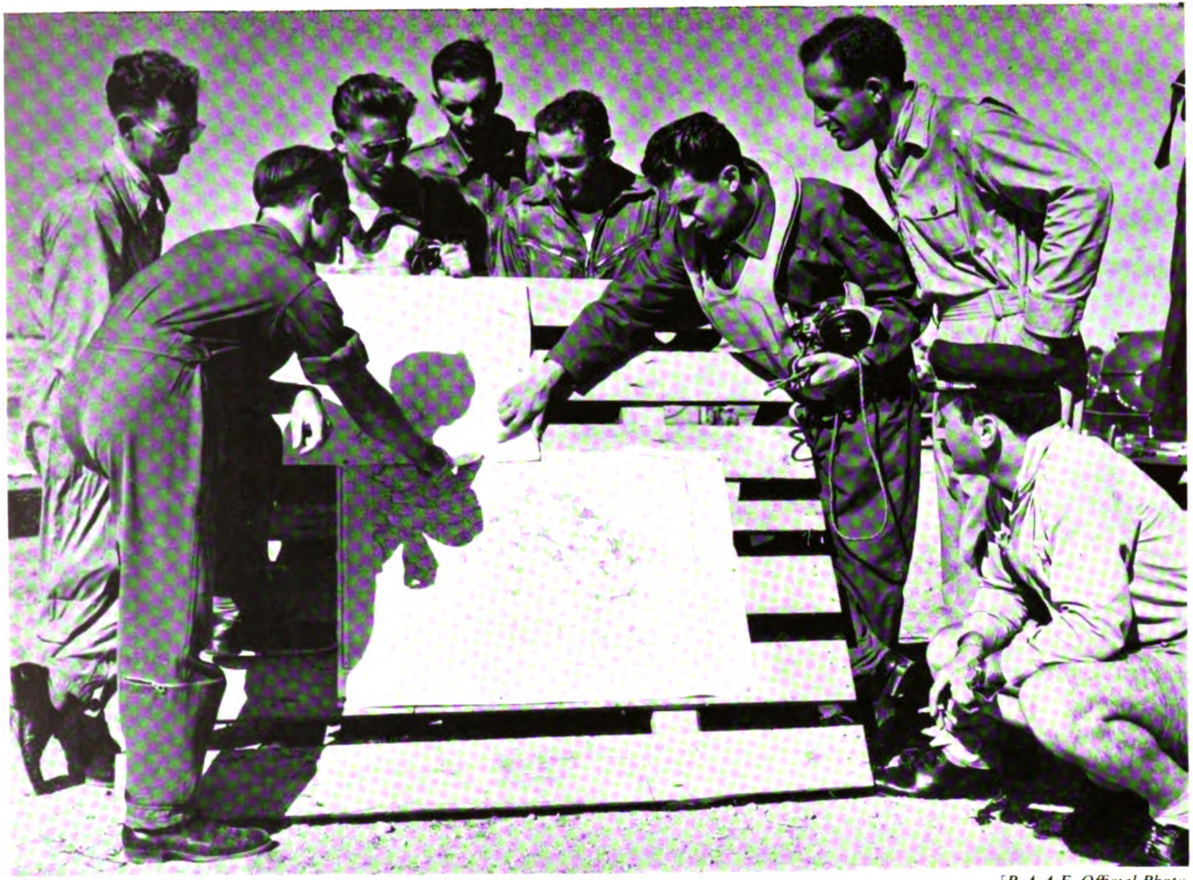
The analysis shows that dividends yielded in experience and specialist knowledge have been abundant—so abundant, in fact, that they not only justify the decision to export No. 78 Wing, they stamp the move as one of the soundest long-range defence investments ever made by an Australian Government.

The Wing's move to Malta was mooted soon after plans had materialized for transforming the R.A.A.F. into a modern jet force. Then, as now, plans for expanding the Service were still in the embryo stage.

However, with such plans and policies at least under consideration, it was important to Australia that the men who constituted the existing R.A.A.F. should be given every opportunity possible to increase their specialist knowledge. In time they would form the diaphragm around which a bigger, streamlined R.A.A.F. would be moulded.

Typical of such types were the personnel drawn together from units all over Australia to form No. 78 Fighter Wing. They included a good blending of experience and youth, men of every mustering needed to build a self-reliant, mobile fighter outfit.

The Wing was placed under the command of one of Australia's top fighter men, Group Captain Brian Eaton, D.S.O., D.F.C. It consisted of a base squadron, No. 378 Squadron, led by seasoned Squadron Leader Geoffrey Newstead; No. 478 Maintenance Squadron, under the capable command of Squadron Leader Jack Kane; and two flying squadrons, Nos. 75 and 76, led by Squadron Leader Ken Andrews and Squadron Leader John "Bay" Adams,



[R.A.A.F. Official Photo

Pilots from a French Air Force Squadron attached to No. 78 R.A.A.F. Fighter Wing, Malta, for a N.A.T.O. Exercise, attend the briefing before the operations commence. They are shown here with Australian pilots studying the area of operations.

D.F.C., A.F.C., respectively. Squadron Leader Stuart "Brick" Bradford, D.F.C., recently followed Squadron Leader Andrews as Commanding Officer of No. 75 Squadron.

Because the two flying squadrons were kept down to half-strength originally, the number of personnel in the ground-staff squadrons also was reduced. When the Wing left Australia the total strength was just under 300.

Malta was chosen as the base for the R.A.A.F. Wing because R.A.F. squadrons previously on the island were needed for duty nearer the nerve centre of the Suez Canal "tepid" war zone. The prime reason for sending the Australians overseas, therefore, was to assist the R.A.F. in its terrific Middle East commitments. But at the same time it was intended that the Australians should be given every opportunity to increase their ability by co-operating with their opposite numbers in the leading air forces of the world.

At this stage it should be understood that the title "garrison force," which seemed to be such a bogey to the critics in Australia, has proved to be most misleading. In virtual fact, the R.A.A.F. unit has acted less like a garrison force since it came abroad than any other unit of the three Services in Australia. This has happened because of Malta's location at the western extremity of the Middle East Command. By being stationed at the "quiet end," No. 78 Wing has not had to carry out the regular police patrol work required of most squadrons in M.E.A.F. But by being in the Command, it has been able to draw on M.E.A.F.'s excellent supply and transport resources. As a result, the R.A.A.F. pilots and ground staff have been able to move freely around the Middle East and Mediterranean areas in their quest for flying and fighting knowledge.

Throughout the first year the stress of work was on mobility—continual movement to weld a bunch of pilots and ground staff into a compact, highly efficient team which could be fully operational within twenty-four hours of arrival at any given airfield.

In the course of that training, No. 78 Wing, or large detachments of the Wing, including all pilots, aircraft and first-line servicing crews, were away from Malta for six months of the first year. Flying log-books began to read like travel advertisements, listing the strange-sounding names of many far-away places such as Habbaniya, Iraq, Cyprus, the Canal Zone, El Adem in Cyrenaica, Tripoli, Tunis, Bizerta, as well as airfields in the United Kingdom, Germany and France. The pilots who flew to all those places were mostly veterans of the air war in Korea. They had been battle-tested with No. 77 Squadron and had gained an appreciation of Communist flying tactics the tough way.

Their new assignment was to study and digest the techniques of experienced flyers and aeronautical experts from the R.A.F., U.S.A.F. and other N.A.T.O. air forces. From such men the R.A.A.F. members could pick up new points to add to their own repertoire.

Since being abroad, the Australians have been given unlimited chances to carry out such an assignment, and in doing so they have played a far more versatile and energetic role than they possibly could have been given in Australia or the Pacific area.

Flying tasks in each of the places visited have included intensive air-to-air interception, bomber affiliation, Army co-operation, Fleet co-operation, gunnery, rocketry and all forms of bombing.

Similar exercises could have been done from any Australian airfield, but what has been so important to No. 78 Wing, and to the R.A.A.F. as a whole, is the fact that since being abroad, No. 78 Wing has done every form of fighter work in a series of vastly contrasting countries and conditions, with and against skilled airmen from nearly every allied air force.

By making close contact with members of other air forces, the men of No. 78 Wing have become infinitely better all-round flyers. They have seen first-hand how pilots stationed in such contrasting places as the deserts of Africa or the forests around Germany's Ruhr Valley have adapted their techniques to suit conditions peculiar to the areas in which they operate.

That learning could never have been absorbed from books or lectures in Australia. By travelling around the world and seeing things for themselves, the R.A.A.F. men now on Malta have derived the same benefits as any Australian who goes abroad to work with the best men of his profession from other countries.

Just as overseas experience improved Frank Sedgman as a tennis player, Neil Harvey as a cricketer, Chester Wilmot as a journalist, or Eileen Joyce as a musician, the R.A.A.F. men of No. 78 Wing have improved as fighter pilots, technicians and future Service leaders.

Another very important feature of the Wing's move to Malta was that the aircraft to be flown by the R.A.A.F. were British-built Vampire Mark IX's supplied by the R.A.F. Although these planes with Goblin engines were slightly less powered than the Australian-built Nenes, they enabled more Australian pilots and ground staff to handle jet aircraft all the time without draining the somewhat limited number of Australian jets.

This means that all No. 78 Wing's training and learning has been acquired without having to use R.A.A.F. aircraft. The servicing crew men, numbering more than 100, who would probably have had to wait their turn to get on to jets in Australia, are now fully conversant with every phase of jet operation, repair, servicing and modification. At the end of their tour in Malta they will return to Australia, and within a very short time should be available to handle Australian-built Canberras and Avon Sabres.

Incidentally, the members of the Wing's Maintenance Squadron have done everything possible to uphold the high prestige earned by R.A.A.F. ground staff in every theatre of the Second World War and in the recent Korean conflict. Despite the huge amount of travel and operations in radically different conditions, the Wing's serviceability rate throughout the first twelve months was 70 per cent. In that time the sixteen Vampires registered a total of 3,325 flying hours and the two Meteor Trainers clocked 323 hours. Those statistics alone stress the ability of the men who worked long hours to handle all the first- and second-line servicing.

When the original No. 78 Wing was formed in New Guinea during the Second World War, it was designed primarily as an Army-support and ground-attack unit. When it was re-formed, it again was a ground-attack unit; but since being abroad the Wing's role has been mainly that of a straight-fighter outfit, even though its Vampires are essentially ground-attack aircraft.

However, there has been some ground-attack work, and Army co-operation has been completed in Libya. The Army-support exercises took place in November, 1952, and in October, 1953, when Wing detachments moved to Idris and worked in the desert with British Comet tank regiments.

Whereas the Wing's scope for Army co-operation work has been limited to the Libyan exercises and some minor attacks against land troops trying to invade Malta in Marine exercises, the scope of Fleet co-operation has been extensive. This is only natural, however, as Malta is the Royal Navy's Mediter-

[*R.A.A.F. Official Photo*

In Cyprus two R.A.A.F. airmen from No. 78 (*Fighter*) *Wing in Malta chat with a Turkish trader.* (*L. to R.*) *L.A.C. Arthur Frizell, of Newcastle, N.S.W., and Corporal Gordon Lee, of Sydney, N.S.W.*

ranean base, and recently it also became the headquarters of the new Mediterranean N.A.T.O. Command.

The R.A.A.F. Vampires have been able to attack and support ships of all kinds during Naval manœuvres in neighbouring Mediterranean waters. They have also been able to penetrate Naval air defences to strike at aircraft carriers and their escorts.

In the last few months the tempo of armament training has been pepped up. All forms of gunnery, rocketry and bombing have been carried out around Malta and on desert targets in Libya. The greatest armament training, however, is done at the R.A.F. Armament Practice Camp in Cyprus, where the Wing spent two months at the start of 1953. A further camp is scheduled for early 1954.

But the striking feature from an Australian point of view of the Wing's tour abroad has been the variety and number of intense air exercises in which the R.A.A.F. planes have played a leading part. These exercises have been of utmost importance in the training of both pilots and the ground crews. They have brought the Australians into close association with R.A.F. squadrons of the M.E.A.F., Home Fighter and Second Tactical Air Force Commands.

Several R.A.F. Auxiliary squadrons have visited Malta and have worked and flown beside the Australians. And probably the closest association of any has been formed with No. 14 Squadron of the Royal New Zealand Air Force, which came to the Middle East at almost the same time as No. 78 Wing.

In addition, the Wing has gone into mock combat against the elements of the Italian, French and United States Air Forces which constitute the air power under the command of Headquarters, Allied Forces, Southern Europe. Most of these exercises call upon No. 78 Wing to provide the main jet air defence of Malta. The pilots and their ground staff are worked flat out, often from first light to dusk, to meet the intensive attacks of all forms of aircraft ranging from Sabres and Shooting Stars to Canberras, from Sea Furies and Hornets to Lincolns and Washingtons, from Avengers and Skyraiders to Neptunes. Often the sky over tiny Malta has been filled with dozens of aircraft milling around at terrific speeds in spectacular dog-fights that we rarely see in Australia. The Wing's Vampires, although they are fine little aircraft, are often badly outclassed for speed in these exercises, but the R.A.A.F. pilots use their great skill to keep in the picture.

In the near future it is hoped that the Australians will be equipped with Venoms. Suggestions that they may get Avon Sabres from Australia have been made, but at present it seems unlikely that the R.A.A.F. Wing will have aircraft different to the rest of the Middle East Command. In addition, the presence of Australian Sabres in Malta would create a difficult supply and maintenance problem.

Two episodes towards the end of the first year abroad clearly demonstrated the value of experience gained by the Wing personnel since they left home. The first of these was the Royal Review of the R.A.F., when No. 78 Wing was chosen to represent the R.A.A.F. in the great air pageant. Led by Group Captain Eaton, twelve R.A.A.F. Vampires in a magnificent formation of three diamonds thrilled all Australians in the crowd at Odiham. During the period they were training for the event all the Wing pilots and about 100 ground staff members were based at R.A.F. Station, Horsham St. Faith, in Norfolk. There the Aussies received splendid hospitality from the R.A.F., and the association firmly cemented the friendship and mutual admiration that exists between the two Services.

After the Review, the Wing detachment flew to Wahn, near Cologne in Germany, to operate in Exercise "Coronet," the biggest and most realistic air manœuvre ever staged by the Allies in Europe. That exercise was the culmination of a year's work, and as far as the Wing was concerned, there could not have been any better test of its ability to be mobile and self-supporting. Immediately the R.A.A.F. men stepped from their Vampires or R.A.F. Transports they were left almost to their own resources. They set up tents in a near-by forest because every permanent building on the station was out of bounds to all R.A.F. and R.A.A.F. men, then went to work to slap war-paint on the Vampires, which were still in their "pansy" Review costume. For six days the Australians worked and sweated, and only slept when there was no work or improvisation to do. But their efforts brought high praise from top-ranking R.A.F. officers who watched the operation. The effort in Germany was perfect evidence of the way in which a year's travel and training had welded a fighting team together.

Today, when the R.A.A.F. is becoming a jet force, it is vital to the future defence of Australia that the men who will fly and service the latest machines have the kind of training and knowledge that members of No. 78 Wing are gaining all the time. There no longer should be any question as to whether Australia can spare airmen to send overseas in large numbers in peace time.

THE R.A.A.F.'s ODD JOBS

By Flight Lieutenant John Tyrrell

P.R.O., Training Command

THE R.A.A.F. is essentially a fighting Service trained and equipped to protect Australia; but it also saves lives. Search-and-rescue on land and at sea, flying serum to a remote town, dropping supplies to a flood-isolated township, operating an emergency evacuation service—these are some of the many odd jobs for R.A.A.F. aircraft.

A vital task that the R.A.A.F. undertakes each year is bush fire patrol, helping the State Forest Commissions to protect one of Australia's natural resources. This is the most tedious of all the R.A.A.F. odd jobs, for during many hours of flying the crews are constantly on the look-out for the tell-tale spirals of smoke which pinpoint a bush fire or its beginning.

Since the end of the Second World War the R.A.A.F. has worked in close association with many civil and Government bodies providing valuable assistance in connection with industrial and national development. This is quite apart from work of a purely humanitarian nature when the R.A.A.F. has been called up—often at short notice—to render aid.

A special unit, No. 87 Survey Squadron, photographed from the air over 2,000,000 square miles of Australia for mapping. These photographs were also used by the Council for Scientific and Industrial Research and by the Bureau of Mineral Resources to speed national development. Special flights across territory, much of which was almost inaccessible by land, were made to facilitate geological and soil surveys. Irrigation and water conservation, town and country planning and development are some of the many other uses for which R.A.A.F. aerial survey photographs were used. When the Antarctic Expedition of 1948 was being planned, the R.A.A.F. assisted by flying a Lincoln bomber 2,600 miles to photograph Macquarie Island and bring back information for the expedition.

The sudden squalls and cyclones which strike the coast of Australia all the year round have made necessary the search for many small sea craft lost while either fishing or on a pleasure trip.

In all cases of search flights, supply-dropping and other mercy flights, the R.A.A.F. had been approached direct and within a short time had supplied an aircraft to do the job. On seaward searches particularly the R.A.A.F. had been called upon needlessly; the launch was reported missing or in difficulties by an inexperienced observer or distraught relative, only to turn up safe and sound while the R.A.A.F. aircraft was wasting aircraft hours searching. A central body to sift all reports and determine their authenticity was needed to save wasted flying hours. The police are often engaged in assisting people in distress and naturally have a great deal of experience in organizing assistance. The R.A.A.F. sought their assistance first in New South Wales to check the reliability of persons making reports on distress incidents. Out of the subsequent discussions the idea of the Rescue Intelligence Centre was born.

The Rescue Intelligence Centre took all reports except those concerning Service personnel, checked them, and then contacted the R.A.A.F. if it thought that an aircraft could help. The organization was given a twelve months' trial and then recommended to all State police headquarters, who have adopted the idea. Since it began in 1948, the R.A.A.F. have not been called out on one false search. In the case of floods, such as those experienced in New South Wales and Queensland in recent years, the requests came from a Government source. The R.A.A.F., however, still co-operates with the police, who in such instances set up their own ground organization, and are able to direct the relief aircraft to drop their supplies in the more critical areas. The R.A.A.F. flew over twelve missions in one month dropping thousands of pounds of food, fodder and supplies to isolated people outback.

Cooktown is a former gold-mining port on the North Queensland coast about 120 miles north of Cairns. Its main avenue of supply is by ship, as what road communication there is becomes impassable in the wet. With little warning a cyclone hit the town and destroyed more than half its buildings, leaving three-quarters of the population homeless, injuring many and interfering with the town water supply. Radio contact only was left to tell the rest of Australia of the town's plight. The R.A.A.F. was asked to help, and within a few hours the first aircraft was ready to fly north from Townsville, the nearest air base, 300 miles south.

Only a few days before this the same aircraft had been dropping supplies to town people south of Townsville who had been ousted from their homes and towns by the worst floods for many years in North Queensland. During the wet season in this part of Australia it is nothing for the rivers to rise twenty-four feet, burst their banks and flood hundreds of square miles in a very short space of time. On this occasion the rivers had excelled themselves, the Burdekin in particular rising over twenty-nine feet and completely inundating two towns near its outlet into the sea. Many people were caught on the roofs of their houses; others more fortunate reached high ground. The water supply was polluted and medical supplies badly needed. The police organized the ground rescue, and R.A.A.F. bombers and Dakotas flew in blankets, food and medical supplies which were needed to prevent an outbreak of disease.

At Groote Eylandt, in the Gulf of Carpentaria, nearly 500 miles east of Darwin, an outbreak of whooping cough reached epidemic proportions among the natives. The R.A.A.F. flew in medical supplies with trained sisters from the Darwin Hospital. On the return trip the R.A.A.F. Catalina carried several of the more serious cases for treatment in the Darwin Hospital. The R.A.A.F. flew several of these mercy flights within a week, and in each case on the return flight the aircraft was diverted somewhere in the northern territory for another case—one an acute appendicitis, and another to airlift a number of natives for hospitalization at Darwin. The 500,000 square miles of the territory are linked only by air. Up there the people look upon the roundel-marked R.A.A.F. aircraft not only with pride, but with deep affection.

In 1951 more than 200 mercy missions were flown by R.A.A.F. aircraft, and in many cases the balance of life and death was swayed by the swift action of the R.A.A.F. At Hay, an outback town in New South Wales, a young lad was dying from severe blood poisoning. The police rang the R.A.A.F. and the Red Cross. The serum was rushed to Laverton, fourteen miles from Melbourne, and within an hour a Mustang of No. 21 (City of Melbourne) Squadron was on its way to Hay.

Macquarie Island is 1,100 miles south of Australia and is an outpost of the Australian Antarctic Expedition. Once a year the members of the island party see a relief ship. For the rest of the year they work on this dreary, wind-swept, half-frozen island alone. Early in 1951 one of the members of the island party became very ill. Extra medical and food supplies were urgently needed, said the radio report to the expedition headquarters in Melbourne. A Lincoln was prepared at R.A.A.F., East Sale, Victoria, equipment packed in storpedos, put aboard, and the bomber took off in the early hours of the morning for Macquarie Island. On the island members of the island party marked out a dropping area on a narrow neck of land joining two parts of the island, and settled down to wait. Dawn revealed a typical Antarctic leaden sky. The wind was blowing hard and the seas were lashing the island shores; but above the boisterous sounds of nature at work, the steady drone of an aircraft became audible to the waiting men. The Lincoln dipped out of the overcast dead on track, made a dummy run over the target, and three runs later the ground party radioed "All received O.K." The Lincoln dipped its wings acknowledging the message and slipped back into the low cloud on course for home and the mainland. It landed back at East Sale, Victoria, after 13½ hours of tough flying in bad weather on a very satisfactory mercy mission.

While this drama was being fought out far to the south of Australia, another and larger struggle to save lives was going on thousands of miles to the north in New Guinea. Mount Lamington suddenly erupted, wiping out native villages and killing thousands of their inhabitants. Civil administration staff were burnt to death or buried alive by the clouds of pumice. Within five days forty tons of supplies, equipment and passengers were lifted by R.A.A.F. Dakotas. The first Dakota flew from Williamtown, New South Wales, taking 400 lb. of blood plasma for the Red Cross, and supply-dropping equipment, water-cans and first-aid equipment for use in the stricken area. A second R.A.A.F. Dakota flew into Moresby from Townsville, Queensland, and then over the Owen Stanley ranges to Popendetta, which the R.A.A.F. made its central base for the supply-dropping operations and evacuation flights. There were virtually no ground communications throughout the stricken area to facilitate quick relief; air supply was the only means of taking in food and water to the population. On the first day one Dakota flew in 6,000 lb. of supplies to the relief centre at Popendetta. The next day it dropped 6,000 lb. at Wairopi, while the second Dakota flew in 4,000 lb. of supplies and more relief workers. And so it went on. The effort would have been bigger but for the weather conditions in the early mornings which hampered flying. The R.A.A.F. later carried out a survey of the whole area to enable the administration to assess the total destruction.

The R.A.A.F. built up an airstrip at Cocos Island in the Indian Ocean for the Sydney-Johannesburg Civil Airline Service. A member of No. 2 Airfield Construction Squadron on the job was seriously injured. At Perth, Western Australia, 1,600 miles away, a R.A.A.F. Lincoln bomber with a nursing sister aboard took off to bring him back to Perth for urgent treatment. Within twenty-four hours the patient was in hospital in Perth.

The R.A.A.F.'s odd jobs have also been directed towards saving property as well as lives. Wild dogs in South-East Gippsland, Victoria, were causing serious losses to sheep farmers. Every night for many months the dogs had been killing large numbers of sheep, and the farmers were almost helpless to combat the menace. The Lands Department of Victoria asked the R.A.A.F. to help. Two thousand poison baits in the form of dog biscuits were flown down from Queensland and the R.A.A.F. dropped them over a wide area. Warnings were issued to towns and settlements in the areas, and the R.A.A.F. aircraft had to fly at below 500 ft. to make sure that none of the baits fell on roads, paths or settled areas. This made the task harder because the drop area was heavily timbered and very mountainous.

The Fisheries and Games Department of Victoria asked the R.A.A.F. for the loan of an aircraft to survey a large area of Port Phillip Bay. The area was

[*R.A.A.F. Official Photo*

Mr. F. Fry, forester for the Mansfield district in Victoria, welcomes Squadron Leader K. Robertson, A.F.C., to his area for demonstration and exercise flights with the R.A.A.F. Helicopter. The flights were in connection with bush fire patrol work.

discoloured and the Department believed that it was a form of organism or animal life known as *Dino flagellate*, and was responsible for the extermination of large quantities of fish. A R.A.A.F. Wirraway with a biologist of the Fisheries Department on board mapped the area for investigation.

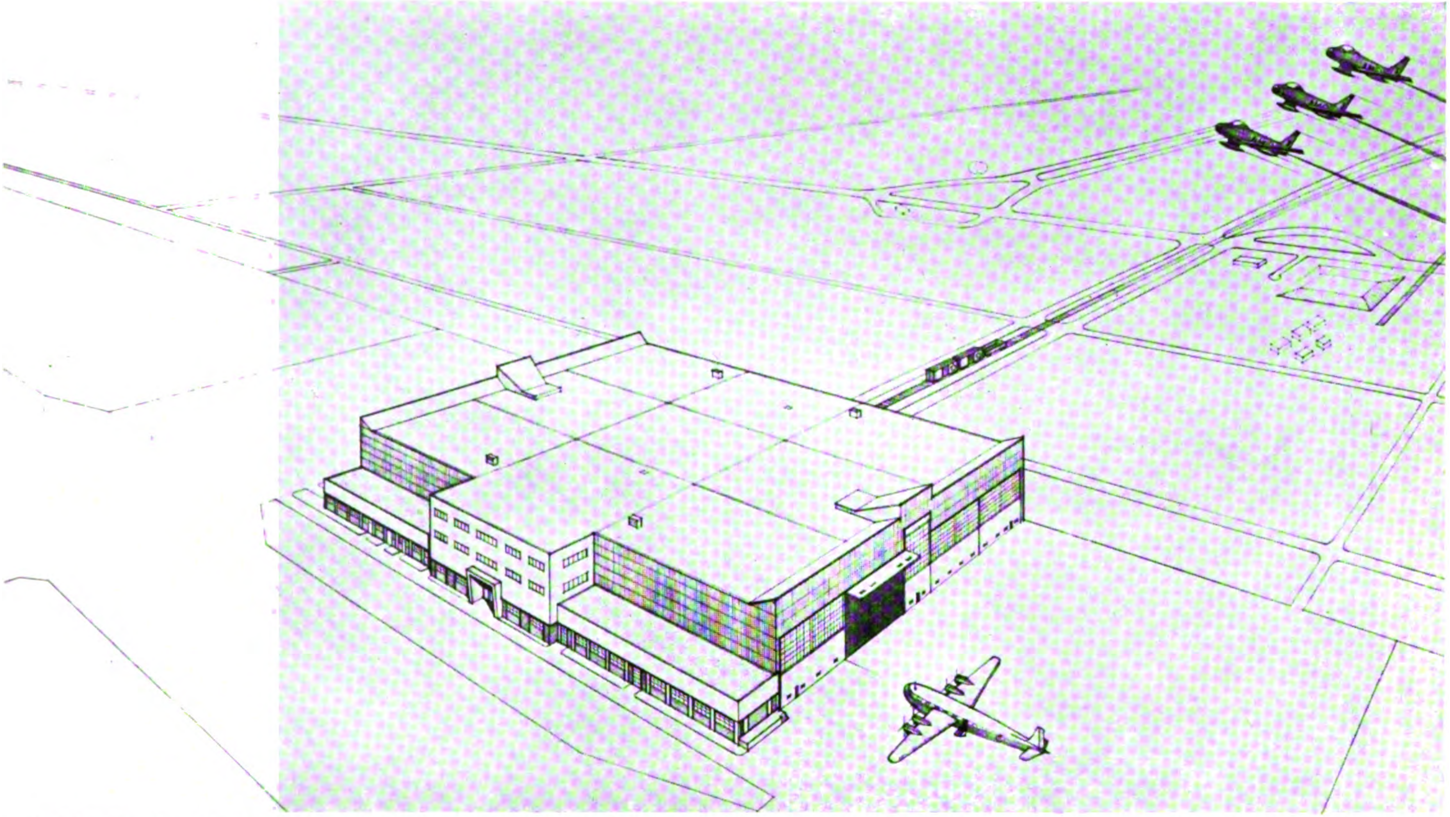
The largest organized effort to save property is the State Forests Commissions' annual fight to prevent the destruction of Australia's greatest national asset, its forests. The R.A.A.F. co-operates each year with the various Commissions by making aircraft available to patrol vast areas of these forests and report fires to the central authorities. In Victoria the whole of the State is divided in the middle, making an eastern and a western portion. R.A.A.F. aircraft stationed at Laverton, about fourteen miles west of Melbourne, look after the western half, and aircraft at East Sale, about 130 miles south-east of Melbourne, look after the eastern half. R.A.A.F. aircraft are on stand-by constantly through the critical period, December to March. Both these portions of the State are also divided into areas and numbered. Each area also has a ground control point with radio facilities. The ground control points are controlled by the Forest Commission operations room in Melbourne, and the aircraft are controlled by Training Command H.Q. Operations in Melbourne. Both headquarters are in constant touch, verifying reports from both sides as they come in. When an aircraft is needed, the Forest Commission calls Training Command Headquarters, asking for an air patrol of certain areas, giving the specific number of the areas. The aircraft takes off and in many cases is flying for six or seven hours.

The R.A.A.F. aircrews are briefed to report fire sightings in a special style. The fire is pinpointed in relation to the nearest town, the area of the fire in square miles is given, the width of the fire front, smoke colour and density, direction of the fire's progress, time sighted, wind speed and direction, the nature of the surrounding country, such as creeks, roads, etc., and also if any people are in the vicinity fighting the fire. This information is radioed to the nearest ground control point for immediate action, and also relayed to Training Command Headquarters Operations. It is vital work, but it is hard flying in Australia's midsummer temperatures.

The R.A.A.F. helicopter has been used on this forest conservation work, but its role is more of a close liaison with the forest fire-fighters. It has not the speed of a normal aircraft to cover large distances on patrol, but it has the ability to take fire-fighters direct to the scene of a small outbreak and kill it before it spreads into a forest fire of uncontrollable proportions.

The R.A.A.F. helicopter has worked in close liaison with the Forest Commissions, saved lives during the floods in Western New South Wales last year, delighted thousands of men, women and particularly children at flying displays in aid of local charities, helped the police during investigations into traffic problems, and co-operated with the Agricultural Departments on crop-spraying tests to eradicate crop pests.

This summer has brought a new menace to crops which the R.A.A.F. has been asked to help eliminate. Grasshoppers in millions are on the wing in Southern New South Wales and are moving south into Victoria's wheat belt. R.A.A.F. land parties are on the job spraying these pests, and a R.A.A.F. Dakota has flown to Narrandera to spray them from the air. It is but another of the R.A.A.F.'s odd jobs.



Aerial perspective drawing of the structural steel and reinforced concrete cantilever hangar designed in conjunction with the Royal Canadian Air Force to be built at several sites for high-frequency major maintenance on all types of aircraft with provision to accommodate large land-based planes.

ROYAL CANADIAN AIR FORCE

R.C.A.F. CONSTRUCTION PROGRAMME

THE R.C.A.F.'s construction programme across Canada, expected to cost an estimated $500,000,000 before completion, is making good progress. Shortages of materials and other obstacles have set back certain individual parts of the programme, but generally the whole construction effort is well up to or ahead of schedule.

The building programme stretches across Canada and involves construction or expansion of both operational flying and training stations, supply and repair depots, command and station headquarters, radar stations, and many other projects.

A major item of the construction programme has been and is the lengthening of runways at stations already in operation, and at reactivated war-time stations. This has been necessitated by requirements of modern jet fighters and heavy transport aircraft. Majority of the war-time-built runways were required only to serve light training aircraft.

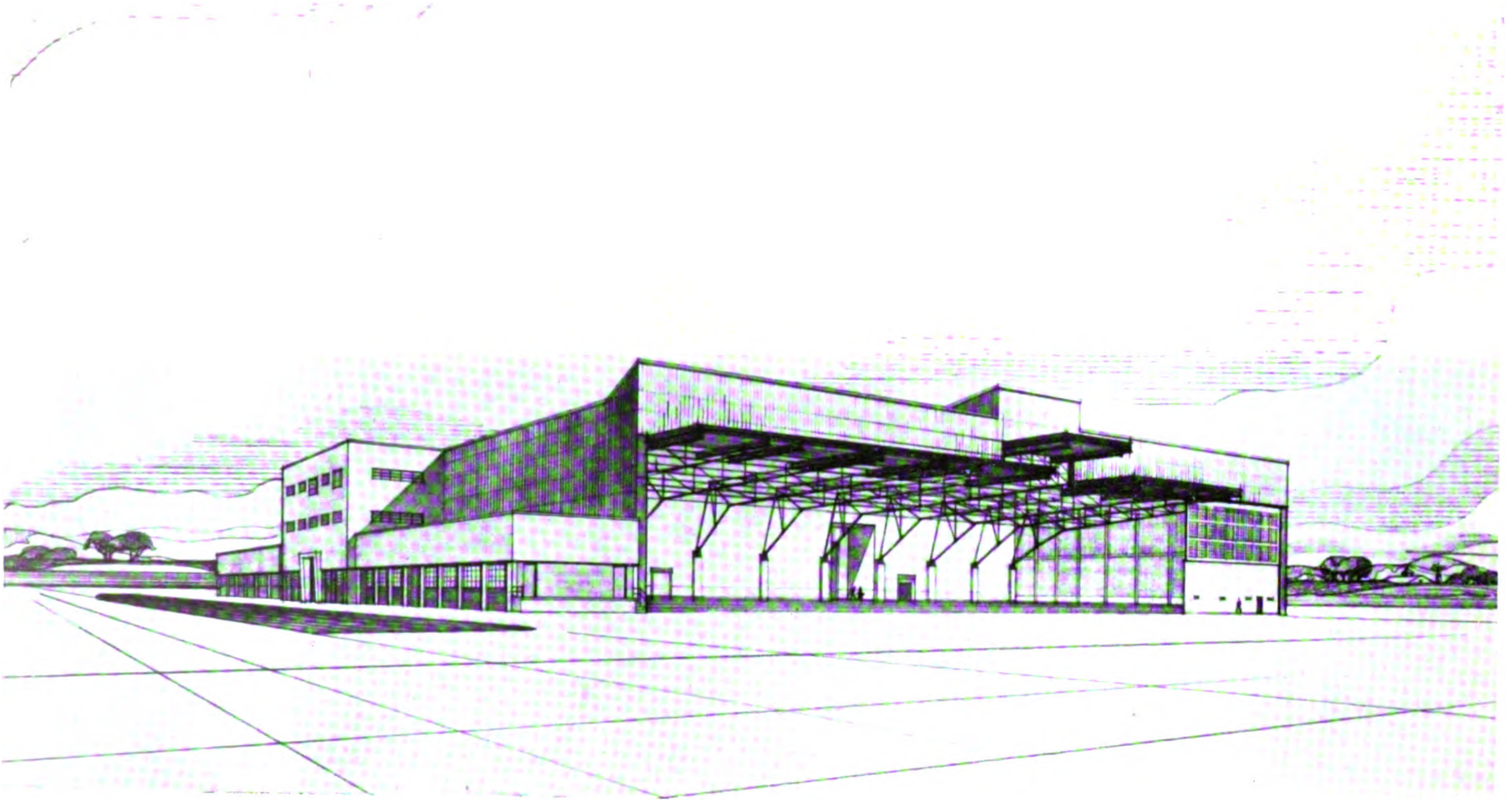
One of the big problems facing Air Force authorities and their consulting architects has been the task of devising structures which will not be outmoded in the near future, but yet which are not prohibitive in cost. During the Second World War the problem was comparatively simple. Practically all R.C.A.F. construction then was of an emergency type, designed only to serve for a limited period of time. Today the problem is somewhat different.

The problem has been solved by dividing new construction into three types, according to the length of time and the degree to which it is felt the R.C.A.F. will require the use of the station or buildings concerned. Construction, therefore, runs from work of a permanent nature to construction of buildings designed for a life span of from five to ten years. Whenever possible, designs and plans allow for future expansion if necessary.

Among the most complicated items included in the building programme are newly designed hangars, being built at numerous airfields. Largest of the three standard types of hangars is the cantilever model, constructed to house the big aircraft of today and of the future. This cantilever model incorporates the experience and the many ideas of Air Force construction officers, and is expected to save money from an over-all point of view. The hangar is so constructed as to provide a good deal of office, working and storage space which would otherwise require separate buildings.

The hangar is also designed to allow ready expansion with an eye to bigger aircraft in the future. The standard cantilever type costs close to four million dollars.

New bombing and gunnery ranges also account for a sizeable part of the total building costs. These must be located in areas where increased firepower of modern fighters can be tested and practised without interruption or fear of damage to persons or built-up areas. One of the most notable of these is being



Ground view showing the cantilevered section on one side of the central core of workshops and stores. The cantilevered distance is 150 feet. The clear opening on each side of the initial building with all of the overhead canopy doors raised is 300 feet long and 41 feet high. The centre door provides greater clearance height for large aircraft with high tail fins.

built at Cold Lake, Alta., and the range will cover an area approximately 115 by 40 miles. Involving construction of an entirely new station, and expected to cost about thirty million dollars, this range is being carved out of scrub land 100 miles north of Lloydminster, Sask. It is one of the biggest single projects in the current construction programme and when finished will be used for bombing and gunnery operations, and can also be used in connection with the development and evaluation of various forms of weapons, including air-to-air rockets. Despite development of the range, the Air Force will still require bombing and gunnery ranges at other points for local use by both regular and reserve fighter squadrons.

The expansion of the R.C.A.F.'s Air Materiel Command is emphasized by construction of two large supply depots at Downsview, Ont., and Namao, Alta. Each will cover close to twenty acres under one roof and will serve as supply points for Air Force units in eastern and western Canada. Ultimately Air Materiel Bases will be located at these two points, incorporating repair depots and other services.

New permanent radar stations now are in use, and account for another large part of the building cost total. Sites for these stations have been determined mainly by their place in the over-all radar screen and often their inaccessibility has made much pre-construction work necessary. Roads have been laid in to the sites through virgin country, water systems from near-by lakes developed, power stations and transmission lines erected and many other services provided for these new outposts of defence.

The new flying training schools, located on the Prairies, have made their appearance on the sites of war-time training stations. In many instances, however, they are almost unrecognizable from their war-time days. Much of the war-time construction has been rehabilitated, but nevertheless substantial new construction work has been necessary. Most noticeable addition are the married quarters, which did not exist on war-time-built stations. In many cases obsolete heating, water and electrical plants have been replaced with up-to-date equipment. Modern runway and airfield lighting has replaced the old flare-pot lighting used on many of the old airfields.

Numerous Department of Transport airfields across Canada are being overhauled for the R.C.A.F. to ensure that they can handle Service requirements. Some of these were used by T.C.A. before it introduced heavy, long-range aircraft that rendered the fields inadequate. Runway construction is the major item at these points.

The unprecedented peace-time demands on the R.C.A.F., both for N.A.T.O. training and for active defence, has necessitated this construction programme.

Drawing a considerable degree of interest from engineering circles is the cantilever hangar, which is going up at various locations across Canada. The new hangars were made by Air Commodore H. B. Long, Chief of Construction of Consulting Engineers,* who worked closely with the R.C.A.F.'s Construction Engineering branch. The suggestion that the cantilever principle be used for the new hangars was made by Air Commodore H. B. Long, Chief of Construction Engineering of the R.C.A.F.

In the cantilever design, the entire weight of the building rests on a central structure, rather than on side walls. As a result, the side walls can be replaced by continuous overhead doors, suspended from the roof. All doors can be opened at once, thus providing no obstacle to the entry of aircraft at any point along the whole length of the hangar.

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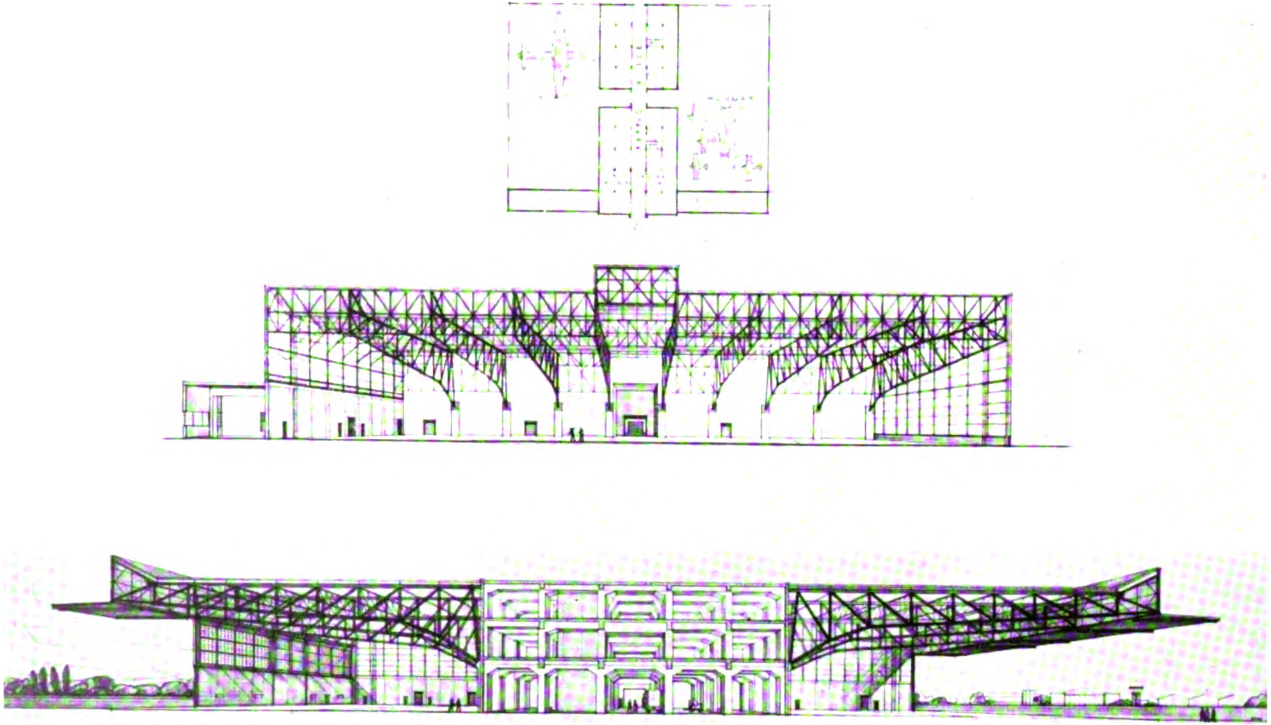
* Margison Babcock and Associates.



CANTILEVER HANGAR

This hangar is considered to be one of the foremost functional units in existence. It provides for a maximum of flexibility in operation and can be extended indefinitely in the direction perpendicular to the cantilevered section. This permits unrestricted opening of the whole length of each hangar area on either side of the central core.

The hangar is heated with a combination of forced hot air and radiant heating. This heating system will minimize lost man hours of work in the aircraft area after opening and closing of doors in cold weather, an important consideration in a hangar where a large number of personnel is involved.

In conventional hangar designs, the width of door openings was limited by the width of the building. Many hangars have become obsolete in the past when their door openings would no longer accommodate newer and larger aircraft. The cantilever design removes all such limitations and will permit entry of the largest existing or contemplated aircraft. In addition, the length of the hangar can be increased indefinitely to match any future increase in aircraft wingspans.

The placing of the workshops in a central area, adjacent to the hangar area proper, permits the use of production-line methods of aircraft maintenance when required.

While it was originally thought that cantilever hangars might be more expensive than conventional hangars, it is now apparent that they will actually provide more economical floor space than standard construction.

The cantilever hangars now being built consist of a three-storey concrete structure 125 feet wide and 300 feet long. From both sides of this building steel cantilevers span out for a distance of 150 feet to form the hangar areas proper, with overhead doors suspended from the ends of the cantilevers. One bay of the hangar doors is 51 feet high and the balance are 41 feet high. The entire building in its basic initial stage thus measures 425 by 300 feet. As previously mentioned, it can be extended indefinitely in the 300 foot direction.

Inside, there is an average clear height of 39 feet to the underside of the trusses and of 53 feet to the underside of the roof.

To conserve ground floor space, much of the building services equipment is suspended from the roof trusses, near the concrete workshops structure. Top floors of the workshop areas are reached by hydraulic-type elevators.

Radiant heating provides approximately 50 per cent. of the heating required by the hangar areas. It consists of approximately 12 miles of pipe buried in the floor and the floor is kept at a constant temperature of approximately 84 degrees Fahrenheit under minimum outside winter temperatures. Because of the heat stored in the floor, it is estimated that with all doors open in zero weather it would take about four hours for the floor temperature to drop one degree.

The radiant heating system is supplemented by unit heaters, automatically controlled by thermostats to maintain the hangar areas at 65 degrees Fahrenheit. The central concrete structure is heated and ventilated by four central forced warm air systems. This whole section is designed on a modular system—divided into small areas, each with its own system of ductwork, sprinklers, lighting and electrical outlets. Movable partitions permit changes in the floor plan.

For fire protection, the building is equipped with an automatic fire-alarm system of thermostatic spot devices and rate-of-rise detectors. Any fire would be recorded on a central control panel by the automatic system. Special sections are protected by an automatic system to flood the area with carbon dioxide in case of fire.

An interesting feature of the hangar's drainage system is the installation of an oil interceptor to remove gasoline and oils from hangar drainage before discharging it into the sewers.

The hangar areas are lighted to an intensity of 25 foot candles, with 8-foot long fluorescent fixtures run in continuous rows. Wiring costs and the problem of voltage drop on wiring feeding fixtures were reduced by the use of 575-volt single-phase ballasts in all fixtures. Workshops are lighted to 40 foot candles using standard fluorescent fixtures.

R.C.A.F. CURRENT EVENTS

PRIME MINISTER'S WORLD TRIP

A R.C.A.F. C-5 aircraft recently took off from Rockcliffe air station near Ottawa carrying the Rt. Hon. Louis St. Laurent on his world tour. The aircraft, attached to 412 Transport Squadron, has a pressurized cabin, and flew at 20,000 feet over territory already familiar to the 16-man crew. Last September, using a four-engine North Star, the crew made an around-the-world flight that took twenty-three days and covered 31,000 miles in preparation for the Prime Minister's trip. The globe-encircling tour took the official party and crew to London, Paris, Bonn, Rome, Middle East, Pakistan, India, Ceylon, Java, Philippine Islands, South Korea, Japan, Midway, Honolulu, San Francisco and back to Ottawa by the middle of March.

New Helicopters for R.C.A.F.

The R.C.A.F. have taken delivery of six Piasecki H21A helicopters. One of the largest helicopters now being built, the Piasecki is fitted with omniphibious type landing gear, capable of landing on land, snow, swamp or water. The R.C.A.F. will use these helicopters for rescue operations. The cabin can be fitted with either twelve litters or twenty seats. Previously the R.C.A.F. used only the single-rotor Sikorski S-51 by their search and rescue units.

The Piasecki H21A, which is over 52 feet in length, has twin rotors driven by a single high-horse-power engine.

The new helicopters were delivered to the R.C.A.F. at Station Edmonton, Alta., where company pilots trained several R.C.A.F. pilots on the new type. The pilots will be selected from a helicopter course now being given at the Canadian Joint Training Centre, Rivers, Man., on the S-51 type machine.

* * *

A COMPUTER FOR PARACHUTE DROPS

A new and improved method of determining the exact moment to drop paratroopers and supplies being parachuted from the air, and which was developed by two R.C.A.F. officers, has been adopted by the United States Air Force.

The new system, in use by the R.C.A.F. for some time, was devised by Flight Lieutenant J. H. Riva, 34, of Canmore, Alta., in conjunction with Flight Lieutenant J. W. Michaud, 29, of Montreal, who worked with him during the latter stages of the system's development.

The two officers have produced what is known as the Canadian (Riva) method of dropping paratroopers and paraborne supplies, and have designed a computer for making the correct calculations. This computer enables the navigator of an aircraft to determine exactly when to ring the jump bell, the signal for the paratroops to leave the aircraft. Formerly, the dropping area was marked by Army personnel from a ground position, or from an advance aircraft. Succeeding aircraft then released their loads when over this ground marker.

[*National Defence Photo*

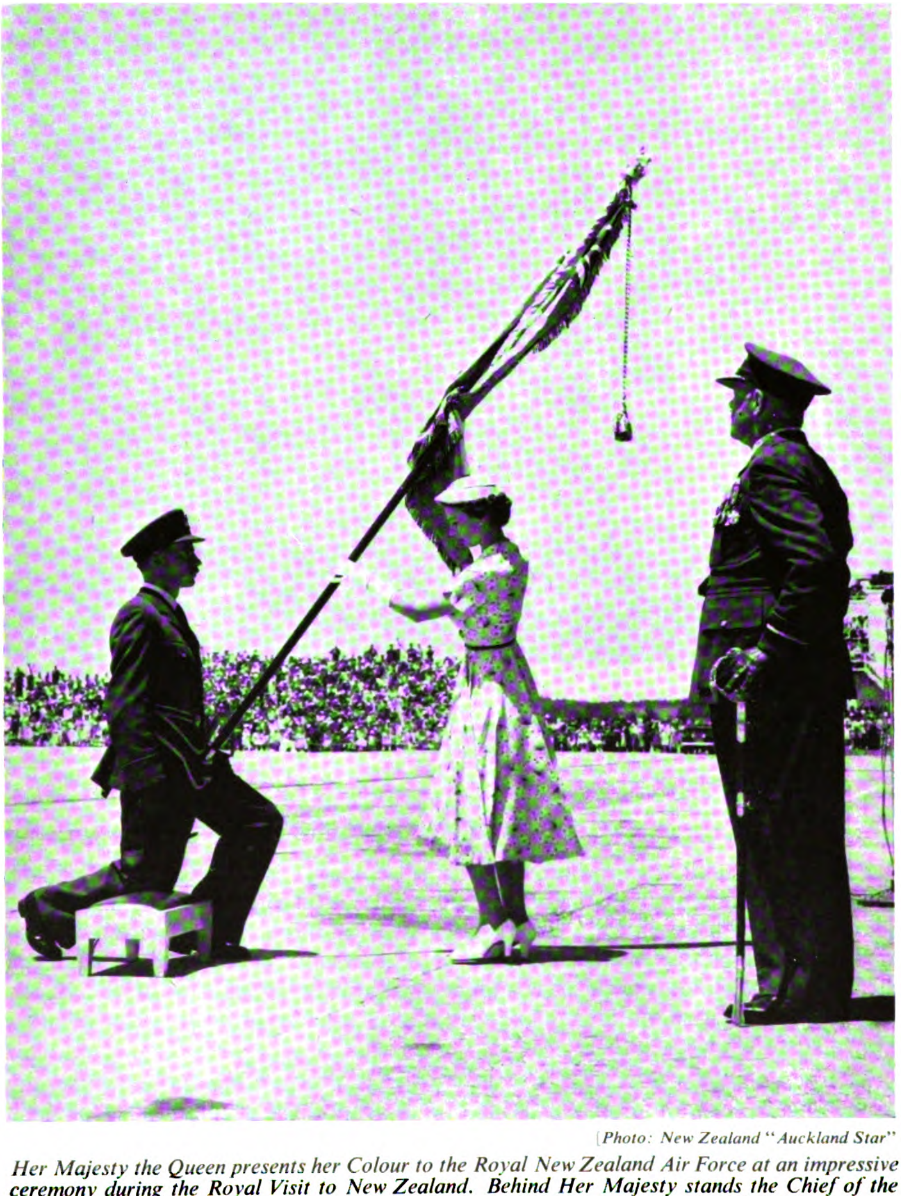
This Air Force community has been raised to accommodate the personnel who man the near-by R.C.A.F. radar site. Radar personnel have modern barracks and messes and excellent recreational facilities.

R.C.A.F. RADAR DEFENCE

Perched on a hill "somewhere in the north country" is a massive radar dome containing an antenna which rotates and sends out a signal over a wide area. The signal picks up aircraft, determining their position. If the station cannot identify the planes as friendly, R.C.A.F. jet fighters are "scrambled" to intercept them. The invisible eyes of this, and many more radar stations of the North American chain, are on guard twenty-four hours a day protecting our country from a surprise attack.

The nerve centre of a R.C.A.F. radar site is the plotting room where airwomen keeps tabs on all planes flying in and around the scanning area of their station. Information on planes picked up by the ever-rotating radar antenna is relayed to these plotters. From this information the fighter controllers can determine how to deploy their jet-fighter force to intercept "unknown" aircraft picked up as "blips" on the highly technical radar equipment.

It's not "all work and no play" for the men and women who operate and maintain the radar equipment for a R.C.A.F. radar site "somewhere in the Canadian wilderness." A modern combined snack-bar, post office, beauty parlour, barber shop, theatre, gymnasium also is the scene for Saturday night and holiday dances on the camp.



[Photo: New Zealand "Auckland Star"

Her Majesty the Queen presents her Colour to the Royal New Zealand Air Force at an impressive ceremony during the Royal Visit to New Zealand. Behind Her Majesty stands the Chief of the Air Staff (Air Vice-Marshal D. V. Carnegie, C.B., C.B.E., A.F.C., R.A.F.). The Colour Bearer is Flying Officer M. F. McD. Palmer

ROYAL NEW ZEALAND AIR FORCE

THE QUEEN PRESENTS HER COLOUR TO THE ROYAL NEW ZEALAND AIR FORCE

BY FLIGHT LIEUTENANT G. BENTLEY

The 28th December, 1953, was an historic day for the Royal New Zealand Air Force. At eleven o'clock that morning, at R.N.Z.A.F. Station, Whenuapai, twenty miles from the city of Auckland, Her Majesty The Queen presented her Colour in a ceremony that will long be remembered in the minds and hearts of some thousands of New Zealanders serving in the R.N.Z.A.F.

It was a brilliant day and a brilliant spectacle. The sun shone from a deep blue sky, across which drifted small light patches of cloud. A light breeze tempered only a little the heat of the midsummer sun. As a Service parade of the first importance, as a spectacle of military pageantry and as a social occasion the ceremony was magnificent.

Six hundred officers, airmen and airwomen of the R.N.Z.A.F. took part in the parade. In addition to more than 200 specially invited guests, there were many thousands of the public observing the scene from tiered grandstands specially erected around the fringe of the tarmac.

Among the parade was a large number of men and women born in the United Kingdom and thus into a tradition of the Royal presence—former members of the British armed forces who had enlisted in the R.N.Z.A.F. in Great Britain in the more recent post-war years. For most of the New Zealanders, however, it was a totally new experience, which engendered a new pride in their membership of one of Her Majesty's Armed Services.

The ceremony began with a Royal Salute—twenty-one guns fired with precision by a R.N.Z.A.F. anti-aircraft battery—as the Queen's car entered the Station grounds. Cadets of the Air Training Corps lined the drive. On the parade ground—a concrete apron flanking the airfield—the representative squadrons, the R.N.Z.A.F. Band and the Colour Escort Squadron, stood smartly at attention. As the echo of the first gun died away, the Royal Standard was broken out at the masthead. As the last gun was fired the Royal car stopped at the dais, and the Queen, accompanied by the Duke of Edinburgh, alighted.

The Station Commander (Wing Commander T. J. MacLean de Lange, D.F.C.) and Mrs. MacLean de Lange were presented to Her Majesty and His Royal Highness, and a bouquet was presented to the Queen by Miss M. G. MacLean de Lange, after which Her Majesty moved to the dais to be greeted by the Chief of the Air Staff (Air Vice-Marshal D. V. Carnegie, C.B., C.B.E., A.F.C., R.A.F.). Members of the Air Board were presented to Her Majesty and the Duke of Edinburgh; then, as the Queen turned and faced the parade, arms came to the present and the National Anthem was played. The Queen, accompanied by the Duke, then entered a Land Rover and inspected the parade.

Then began the ceremony of the Consecration of the Colour, which lay uncased upon piled drums.

The Rev. A. R. Allerton, M.C., the Senior Chaplain, described the Colour ". . . the solemn symbol of our loyalty and with it ourselves, our service and our life. May this Colour never be unfurled save in the cause of justice, righteousness and truth."

The sun gleamed on bayonets and on a line of transport aircraft beyond as he laid his hand on the Colour.

". . . to the glory of God and as a symbol of our fellowship with Him, and with each other, we consecrate this Colour, in the name of the Father and the Son and the Holy Ghost."

Heads were bowed as he led the prayers, ending with a quiet "God Save the Queen."

The service ended with a solemn invocation:

". . . Go forth into the world in peace, be of good courage, hold fast to that which is good, render to no man evil for evil, strengthen the faint-hearted, honour all men, love and serve the Lord. . . ."

As his voice died away, the Chief of the Air Staff moved forward and handed the Colour to Her Majesty. The Colour Bearer (Flying Officer M. F. McD. Palmer), sinking on his right knee, received the Colour from the Queen. Her Majesty's address followed:

"Air Vice-Marshal Carnegie, officers, airmen and airwomen of the Royal New Zealand Air Force:

"I am very happy to be here today to present to you my Colour.

"I congratulate you on your fine display of drill and on the excellence of your dress and bearing.

"This day will always be a memorable one for me, for it is my first visit to my New Zealand Air Force. But if I have never before had the pleasure and privilege of meeting you in your own homeland I have heard much of your valour in war and of your skill and enterprise at all times. And I know of the fine traditions that have been so firmly laid by your predecessors and by yourselves.

"I have not been disappointed by what I have seen today. Rather have I been filled with pride, and with the conviction that you will go on to create an even finer tradition on these foundations.

"I give you my Colour in the knowledge that you will guard it well; in the belief that it will always remind you of the trust I place in my Royal New Zealand Air Force. During your future service you will, I know, be always worthy of that trust, and will always strive to maintain the high and honourable standards of which this Colour is a symbol."

Speaking in reply, Air Vice-Marshal Carnegie said:

"Your Majesty, your gracious presentation of the Queen's Colour to the Royal New Zealand Air Force is an historic and inspiring occasion; historic since this is Your Majesty's first visit to a Station of Your Majesty's Royal New Zealand Air Force and because this is the first Queen's Colour to be presented to this Service; and inspiring, since it shows Your Majesty's confidence in one of the youngest of Your Majesty's Air Forces.

"Your Colour will ever be a symbol of inspiration to the Royal New Zealand Air Force; of pride to those who have served in its ranks; and of remembrance to those who have been called to a higher service."

The General Salute was followed by the National Anthem, and the Colour Escort Squadron marched past in Review Order. The Band played "Cavalry of the Clouds" and the flights moved off in precision, breaking into slow time as they approached the dais.

The Duke of Edinburgh took the salute.

Following the march past, the parade doffed headgear and three cheers were given for Her Majesty. The cheers from 600 throats were free and full, and the Queen acknowledged them with the smile that New Zealanders have come to know so well.

The whole parade then marched past, and the ceremony was over.

After Her Majesty had left Whenuapai in the Royal Dakota, flown by men from the Service she had just honoured, the Colour was lodged in the foyer of the Officers' Mess at the Station.

* * *

The Queen's Colour could be described as "a blue field, surrounded by a ring of New Zealand fern leaf in gold, with the Union Jack in the top left corner, the four stars of the Southern Cross in the top right corner and the Royal Cipher surmounted by a crown in the centre."

CAPTAIN OF THE QUEEN'S AIRCRAFT

[*R.N.Z.A.F. Photo.*

Squadron Leader C. L. Siegert, M.V.O., D.F.C., A.F.C.

During the Royal Tour of New Zealand, the captain of Her Majesty's aircraft was Squadron Leader C. L. Siegert, M.V.O., D.F.C., A.F.C., R.N.Z.A.F. Since the inset picture of this officer was taken, he has been awarded two further decorations to add to the medal ribbons he already wears.

On 12th January, 1954, he received from Her Majesty The Queen personally the Air Force Cross, which he had been awarded earlier for meritorious service as a transport pilot, culminating in his safely landing a disabled Hastings aircraft in Ceylon during a tropical storm at night (in the London-Christchurch Air Race last October). Later he was awarded the M.V.O. by Her Majesty at a private investiture at Christchurch.

Squadron Leader Cyril Laurence Siegert, M.V.O., D.F.C., A.F.C., was born in 1923 at Fairlie, South Canterbury. He was educated at St. Kevin's College, Oamaru, from 1936 to 1939, and played for the 1st XV and the 1st XI. He joined the R.N.Z.A.F. in 1942 and trained as a pilot. He served with Nos. 297, 299 and 199 Squadrons, Royal Air Force, during the Second World War, and was awarded the D.F.C. following secret missions to Arnhem. He was seconded to B.O.A.C. at the end of the European war and flew on the United Kingdom-Middle East and the United Kingdom-West Africa routes. He was a R.N.Z.A.F. Dakota captain on the New Zealand-Japan route in 1947-49, and later took part in the Berlin airlift.

BOOK REVIEWS

Royal Air Force 1939-1945. Volume 1—The Fight at Odds. By Denis Richards (Her Majesty's Stationery Office, York House, Kingsway, London, W.C.2. 430 pp. Ilustrated. 13s. 6d.).

No historian can hope to satisfy his readers; because it is impossible to crowd into one volume all the important events of two thousand years, or even two thousand days, and yet find room for the little human, personal incidents that are the very lifeblood of our existence.

When I picked up this book, I searched first for Mr. Richard's account of the hopelessly gallant struggle of a few obsolete Gladiator biplanes against the might of the Luftwaffe from a frozen lake in Norway in 1940, because a dear friend had been among their pilots. Needless to say, I was disappointed, because how could any author have recorded every individual act of heroism of so small a force, when he had only 430 pages in which to describe the whole pattern of the first two years of an air war that raged over half the world?

Yet, long before I reached the 430th page, I found myself wondering, not that so many details had been left out, but that so many had been included. More than that, this is a very readable history; which is important, because every man, woman and child in these islands had some intimate, personal interest in the R.A.F.'s triumphs and sacrifices during the war, and it is right that this official history can be read and understood by them, and not be merely a text-book for students and strategists.

There is no dearth of drama in the record of those grim weeks in May, 1940, when the Battles and Blenheims of the A.A.S.F. flung themselves in the path of the German Army in Northern France, with the loss on one day of forty out of the seventy-one bombers which took off. But disaster is balanced by the triumph of the Battle of Britain, described in a glorious chapter worthy of its subject; and by the little-known, immensely inspiring story of the achievements of the Oxford "bombers" and the " 'arts with 'ooks" of No. 4 Flying Training School during the Iraqi Campaign, the strategic importance of which was belied by the smallness of the forces engaged.

Through these pages we learn again of the immense debt we owe to the Hurricane fighter, which endured the burden and heat of the day on every front in 1939-41; and to the flying boats which alone could evacuate persons whose safety was vital to our cause, when airfields were no longer available. And we can read of many of the war's "secret weapons"—radio counter-measures; the parachute-and-cable and "Mutton" anti-aircraft devices; "Collie's battleship" and the Heath Robinson missile dropped on an Italian fort by the frustrated pilot of an ancient Valentia transport.

Above all, there are lessons to be learned from every page of this story. The old fallacy that we were down to our last half-dozen reserve aircraft in the Battle of Britain is exposed once and for all—so is the even more significant fact that we *were* nearly down to our last half-dozen pilots. The matter of exaggerated claims of enemy aircraft destroyed is discussed and explained satisfactorily. The vital importance of effective photo-reconnaissance and the necessity for specialized navigation aids are emphasied. Indeed, no attempt is made to hide the fact that up to September, 1941, only one in ten of our bombers had ever arrived within five miles of its proper target in the Ruhr.

There is no inter-Service bickering in this history. The Army's complaints of lack of air support at Dunkirk and elsewhere are answered but not rebuked. The Navy's part in the tide of the battle is given ungrudging, even generous praise. If Volumes Two and Three are as good as this one, the Royal Air Force certainly need have no fear that its historians have failed to do justice to its splendid achievements. J. W. R. T.

Jane's All the World's Aircraft, 1953-54. Compiled and edited by Leonard Bridgman. (Sampson Low, Marston & Co. Ltd., 25 Gilbert Street, London, W.1. 352 pp. and index. Fully illustrated. £4 4s.), and

The Aircraft of the World. By William Green and Gerald Pollinger. (Macdonald & Co. Ltd., 16 Maddox Street, London, W.1. 160 pp. Fully illustrated. 25s.).

Despite the similarity of their titles, these two books have little in common. Each contains pictures and data of hundreds of aircraft flying all over the world today; but in detail their contents are entirely different and they are aimed at two different classes of reader. If this were not so, there would be little point in publishing *"The Aircraft of the World,"* for *"Jane's"* has been accepted as the standard reference work on the products of the world's aircraft industries for forty-four years.

This year's issue follows the same general lines as the 1952-53 one, except that the section dealing with the world's airlines has been considerably expanded. Inevitably, the balance is once more heavily on the side of military aviation, and a glance through *"Jane's"* will indicate the trends of design mentioned in my article on page 251. Here are the first of the new high-performance jet-and-rocket interceptors, the long-range atom-bombers; the ever-large all-weather fighters—and, of course, even more and bigger helicopters than last year. If you want construction details of the Canberra's wings, the loaded weight of a Sycamore helicopter, cruising speed of M. Mignet's latest "Flying Flea," or the name of Convair's Engineering Vice-President, you will find them all in *"Jane's,"* complete with 726 photographs, and full details of every important aeroplane, engine and airship being developed in the world today. This, then, is the book for the aircraft engineer or air force strategist.

"The Aircraft of the World" meets an entirely different need. It contains smaller photographs and brief "background" and specification data on virtually all aeroplanes flying anywhere in the world, no matter how old they are or how many still exist. Important types are also illustrated by a three-view silhouette: and it is, therefore the answer to the prayers of recognition instructors or collectors, who want pictures of all the aircraft they are likely to see, in one compact comparatively inexpensive volume. Certainly, no squadron library or Royal Observer Corps Post can afford to be without it.

The only criticism that can be levelled at it is that its authors have concentrated too much on trying to find hitherto-unpublished photographs, with the result that they have used ground views of aircraft such as the Provost and Meteor NF11 when flying shots would have been so much more informative to the "spotter." J. W. R. T.

Report on the Atom. By Gordon Dean. (Eyre & Spottiswoode, London. 288 pp. and 16 illustrations; Jan., 1954; 16s.)

The author was Chairman of the United States Atomic Energy Commission from July, 1950, until June, 1953. This report is a comparative over-all picture of progress in the international sphere. Although laying stress upon the lead gained by America in this atomic age, he pays fair tribute to the great part taken in the early days by scientists of many nations which enabled the U.S.A. to attain her present position, and his book contains a full account of the development of atomic energy from its birth until the present day.

The description of the multitudinous details of the highly complicated processes of nuclear fission requires considerable concentration and does not provide light reading, but apart from that, as Mr. Dean writes not as a theoretical scientist but as a layman who has had to try to understand what the scientists are doing, his report is easily understandable and interesting to other laymen.

It provides authoritative information on each of the many stages involved, from the search for the uranium ore to the completion of the job in hand, be it atomic bomb, atomic guided missiles or energy to power submarines. The author allows himself a reasoned speculation on the many other uses to which atomic energy could be diverted for the greater benefit of mankind, when conditions make it possible to cease concentrating upon its use for their wholesale destruction.

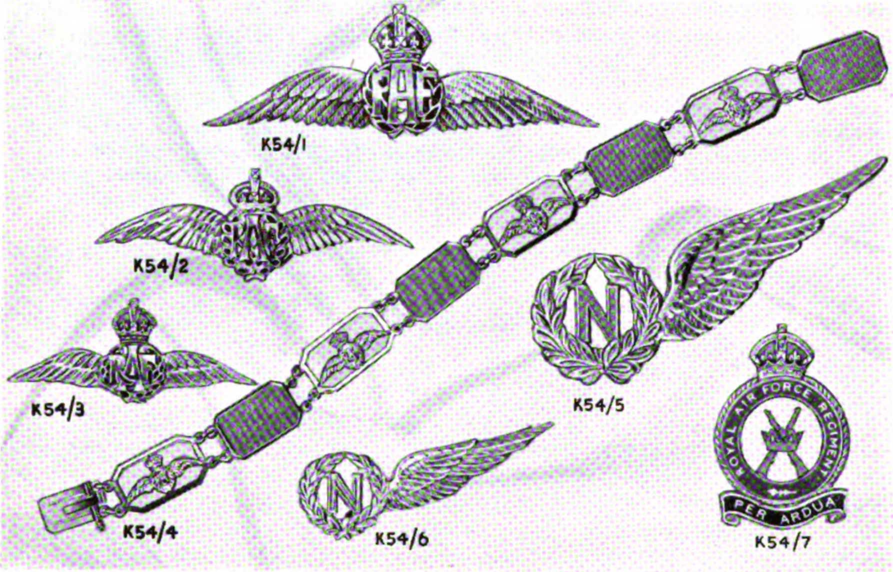
Mr. Dean issues a grave warning against complacency in regard to Russia's progress in the production of atomic weapons; in his opinion it should not have been a matter of surprise when they tested their first atomic bomb in 1949: in fact, her development rate, after a late start, is equal to that of America.

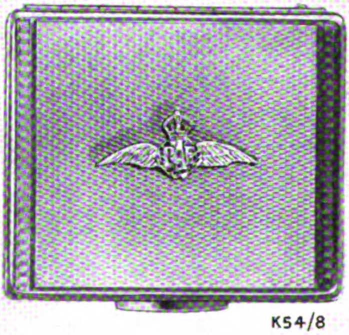
While the present state of international tension exists, the author points out the need for complete control of everything affecting the production of atomic energy; he explains how this is organized and the many difficulties of maintaining complete secrecy and security. As the author so aptly describes it: "It is no small problem to keep even one rotten apple from entering the barrel of the Atomic Energy Commission."

In the last chapter, "The Way Ahead," when forecasting the probable uses of atomic energy, when international tension disappears, he predicts that in 1963 we may have large electric generating stations, large liners and aircraft powered by this means; but underlying the whole problem of its use are the crippling production costs.

It is abundantly clear from his report that at present the financial burden on any nation engaged in the production of atomic energy is a grievously heavy one.

A. H. S.





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Heaven Next Stop. By Gunther Bloemertz. (William Kimber & Co. Ltd., 46 Wilton Place, London, S.W.1. 189 pp.; illustrated; 12s. 6d.)

This is another volume of war memoirs by one of Goering's fighter pilots—similar in some respects to Heinz Knoke's book* reviewed in the October, 1953, issue of AIR POWER, and yet sufficiently different to make it worth buying. Unlike Knoke, Bloemertz does not give the impression that he was ever a fanatical Nazi. He was only 19 when he fought his first air combat as one of the "Abbeville Boys," and his book reflects all the horrors of war seen through the eyes of a boy who was expected to fight and die like a man.

He was fortunate in having Focke-Wulf 190's to fight in, instead of war-weary Me.109's; but even these were no match for the steadily growing and finally overwhelming might of Allied air attack. His descriptions of air combats and of his experiences on the ground during a R.A.F. raid on Dusseldorf give a grim picture of the dreaded suffering that Hitler's folly inflicted on his people, and show how little glory, humanity or profit there is in total war.

It is an enlightening book. We can, for example, see the effect of one of the Fuehrer's personal, irrevocable orders which compelled his fighter pilots to attack U.S. heavy bomber formations from the rear instead of head-on, with the result that they had to fly into the concentrated cross-fire of hundreds of guns for thirty seconds instead of three. And we are reminded towards the end of the book of Hitler's belief in revolutionary, untried aircraft and weapons to win a war that was already lost. New jet fighters are received by squadrons; but they prove unflyable.

Bloemertz tries hard to make us realize that pilots of the Luftwaffe were ordinary, decent young men, fighting for what they believed to be right; and, looking at the pictures of some of them relaxing in chairs, waiting for the order to "scramble," they do resemble pictures in our histories of R.A.F. pilots in the Battle of Britain.

Unfortunately, one cannot help recalling that the victorious German of 1940 was so much more arrogant than the German of 1944-45, when the war was nearly lost. The change is very apparent when one reads *The Rommel Papers*, and it would take more than Gunther Bloemertz to persuade me that the bombing of Warsaw, Rotterdam or Coventry was any more humane, or in a better cause, than the later bombing of Dusseldorf.

J. W. R. T.

Soviet Policy in the Far East. By Max Beloff. (Issued under the auspices of the Royal Institute of International Affairs. Published by the Oxford University Press and Geoffrey Cumberlege, London. 278 pp.; 21s.)

Without so much as a preliminary flourish, Mr. Beloff explains that the purpose of his book is "to provide an account of the development of Soviet policies in East and South-East Asia from the negotiations concerning eventual Soviet participation in the war against Japan culminating in the Yalta Agreement on the terms of entry of 11th February, 1945, to the San Francisco Conference on the Japanese Peace Treaty in September, 1951." Except in his final pages, where he takes the opportunity of bringing more recent events under review, Mr. Beloff keeps rigidly to his brief, asking readers to remember the spade work done by himself in *The Foreign Policy of Soviet Russia, 1929-1941*, by Miss Harriet M. Moore in *Soviet Far-Eastern Policy, 1931-45* and by D. J. Dallin in his two pioneer works. In uniting himself thus, Mr. Beloff has possibly diminished the value of his book for the non-specialist reader. It is possible that the specialist reader will be disappointed, too, and wonder at times whether, perhaps, the author has done wisely in expanding the original paper he contributed to the Conference of the Institute of Pacific Relations, held at Lucknow in 1950, into a book the size of the present one.

The problem that Mr. Beloff has faced in writing this book is, however, insoluble. It has twin roots. First, there is the insufficiency of documents upon which to base a firm opinion. Secondly, there is the difficulty inherent in all discussions on current affairs—and Mr. Beloff's book is essentially a discussion of this sort—that one is too close to the events described to be able to discriminate effectively. The chapter on Soviet policy towards Japan and the countries of South-East Asia (the latter section written, incidentally, by Mr. J. Franckel, an expert on this area) reveal how serious the insufficiency of documents can be. On the central problem of Russia's relations with Maoist China, Mr. Beloff is braver than most commentators, and admits with disarming frankness that, as yet, we must suspend judgment on such questions as Mao's prestige since Stalin's death, Mao's latent Titoist tendencies, collisions between Soviet and Chinese policies, and so forth.

This book, notwithstanding its shortcomings, is a very useful contribution to our know-

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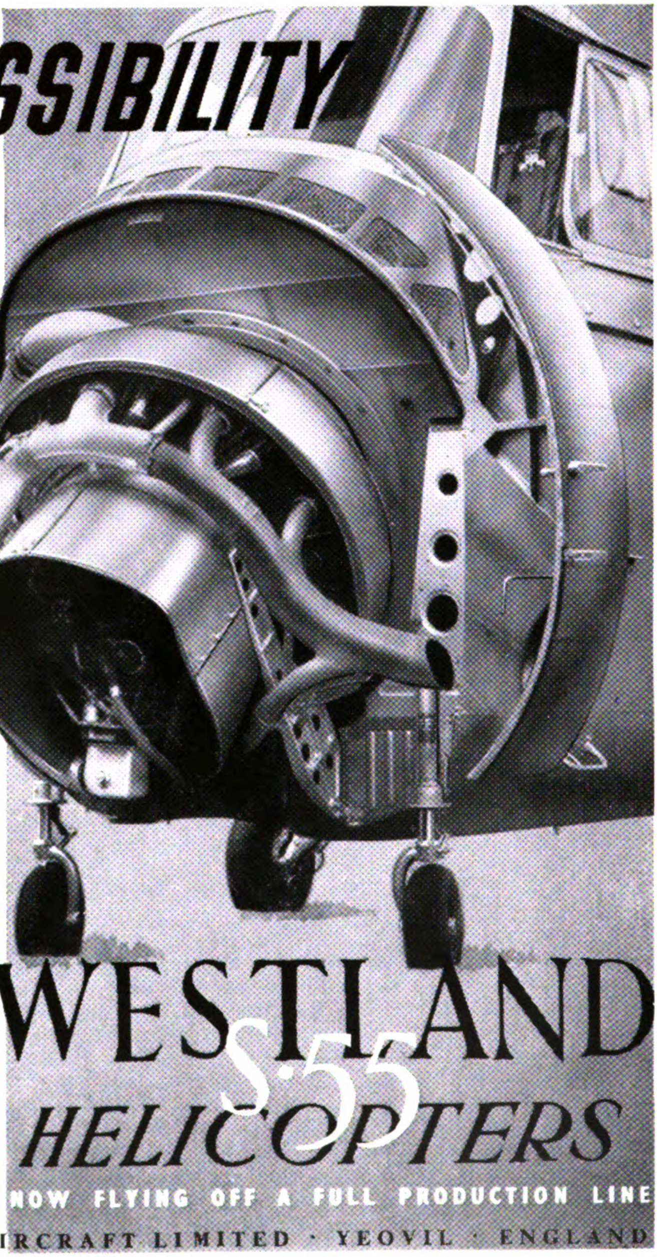
* *I Flew for the Führer.* (Evans Bros.)



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ledge of Soviet strategy in the Far East and should prove an admirable corrective to much wild thought on this subject. It is possible to mention one or two points only. Mr. Beloff clearly does not believe that Stalin foresaw the early collapse of the Kuomintang régime, and has much to say that is of interest on Russo-Chinese relations down to the middle of 1950. He has a valuable paragraph on rail and air transport links between Russia and China (p. 89). Dealing with the Chinese border-lands, he stresses the close affiliations of some of the peoples of these regions with minority populations living within the U.S.S.R. Again on transport, Mr. Beloff underlines the fact that both Mongolia and Sinkiang are more accessible from the Soviet Union than from China. The author has much to say that is of interest on Japan. Japan's diplomatic manœuvres aimed at extracting herself with some honour from the war are briefly touched on (p. 103). It is possible that Mr. Beloff is too sweeping in his view that the Western Powers, as well as the Russians, held an exaggerated opinion of Japan's ability to continue hostilities after the end of the war in Europe, but he is undoubtedly right in reminding us that the Russians paid little attention "then or later to the importance of the atomic bomb in the conclusion of the Japanese war." He might, perhaps, have stressed the point, forgotten by both the Russians and ourselves, that the decision to use the bomb at all must be seen in the perspective not only of the military position as it was in July, 1945, but also of the political position, particularly in view of Japanese soundings of the Russians and the West for terms. Professor Blackett's fiction that the dropping of the bombs was, in fact, the "first move in the cold war" is properly disposed of (p. 106), as it needs to be. The effects of American thinking of Japan as a defensive barrier to further Soviet expansion are touched on (p. 125). On the subject of Korea Mr. Beloff does not appear to take the view that the "Soviet Government . . . deliberately planned the attack" of 1950, and points out that "the precise nature of the co-ordination existing between Moscow and the Chinese and North Korean Governments at the time remains obscure." Possibly a detailed analysis of North Korean broadcasts might throw a little light on the question of Soviet responsibility or foreknowledge?

One turns to Mr. Beloff's concluding chapter with expectation, and one is not disappointed. He does not believe that it is possible to elucidate post-war Soviet policy *vis-à-vis* China exactly owing to the insufficiency of information. The Soviet attitude to Japan and Korea, he believes, is easier to ascertain. It is least precise "in regard to areas where no definite Russian interests exist," e.g., South-East Asia. The author underlines the curious inability of the Russians to appreciate the main political and economic problems of this area. Indeed, as he says, the Western student is "bound to be struck" by the "extreme scholasticism" of the Russian approach to these problems. On the other hand, as Mr. Beloff is quick to note of the period under review, the "most novel and disturbing feature of the whole story from the point of view of the non-Communist world was the apparent ability of the Soviet Union to fight its Asiatic struggles almost entirely by proxy." J. F. L. L.

The Rise and Fall of the German Air Force, 1933 to 1945. [Issued by the Air Ministry (A.C.A.S.[I.]).]

(Extract from the Memoirs of General Koller, Chief of the German Air Staff)

WHY WE LOST THE WAR

We have lost the war. Far-sighted persons had already long seen this coming, but one is always moved by the questions "Why?" and "Couldn't it have happened differently?" There are many reasons why Germany lost the war: political, economic and military reasons which were our own fault. None of these reasons were decisive in themselves, nor were they together decisive. Had they been avoided a more favourable development of the situation might indeed have been possible. Quite apart from them, what was decisive in itself was the loss of air supremacy.

The campaigns in Poland, Holland, Belgium, France and Norway had proved unequivocally how important air supremacy is in a modern war. Instead of radically drawing the proper conclusions, the German High Command strove to forget the historical facts as soon as possible and covered with glory branches of the Service which in the opinion of honest leaders had played a less than moderate part in gaining the victories.

Not Germany, who showed what superior air forces and skill in leading them mean, learned the lesson, but on the contrary the enemy countries, who drew the proper and logical conclusions and with an iron tenacity built up a superior air force which alone could lead to victory. As long as we had air supremacy nobody interfered with our shipping in the North Sea, along the German coast and from Holland to Brest, Bordeaux and Spain. The British Fleet did not show itself; no noticeable traffic dared to enter the Channel and they often hardly dared to go into the southern part of the Irish Sea, and everything was forced to the far north.

ETHELBERT AND THE TRUSTY BLUDGEON

In days of yore there lived a famous old warrior, one Ethelbert, who armed himself with a club or bludgeon of such weight and size that all who looked upon it quaked in their sandals and fled. No, not quite all. Ethelbert's cave was dry and warm, his wives were the loveliest and most pulchritudinous in the land, and in certain hearts envy proved stronger than fear.

One day Ethelbert was attacked by a neighbouring tyrant named Osric. Ethelbert swung his club and dealt Osric a heavy blow on the skull or noggin, but strange to relate the tyrant survived. He was down . . . and up like a flash and was soon using his own club to some purpose . . .

"That club of mine," thought Ethelbert, while his womenfolk were charming away his bruises, "is neither big enough nor heavy enough. I must make another of the toughest oak and I must bury weighty flints in its business end."

The new club was hardly completed before Ethelbert was attacked again. As his adversary came in the old warrior swung his club . . . but its reinforced warhead proved too heavy for his grasp. The weapon flew from his hands and buried itself in a swamp twenty cubits distant.

How Ethelbert survived that encounter he never knew. Battered and sore he resolved to fashion an even stouter club and to secure it to his body by means of a strong leather harness.

A month later his cave was invaded by Ulser the Bad, one of the boldest thugs in all the land. This time Ethelbert was able to retain his club, but so cumbersome was his harness that his blows were few and far between, and Ulser the Bad belaboured him repeatedly and painfully.

The battle raged for eight hours and ended only when both men were too exhausted to do more than paw the air and stagger in ever-widening circles . . .

When Ethelbert's wives found him they dragged him back into the cave and applied healing herbs to his wounds. For three nights he lay unconscious and for three more he was delirious. "Club, club, club . . ." his wives heard him moan, "bigger club, stronger harness, more flints . . ."

And when his fever subsided he called immediately for oak and cutting tools.

"Another even bigger club?" said his wives.

"Not this time," said Ethelbert, grinning, "I'm going to see what I can do with a smaller model, and what's more I'm going to arm all of *you* with clubs, too—just in case. Neat, handy little instruments with a kick like a mule. I don't want to get involved in another show like the last one."

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As long as we had air supremacy nobody threatened our industries or the peaceful life of our homeland; our lines of communication in the Mediterranean were not interfered with. If our air supremacy had been kept up right from the beginning and at the cost of other armament programmes, we would not have been defeated in Africa or in the Mediterranean area. German air supremacy—and we would have been able to maintain a capable industry and intact lines of communication; German air supremacy—and England's supplies would have been badly damaged before she could have built up her maximum war production. German air supremacy—and this massed concentration of strong air forces in England would not have been as easy as it was. German air supremacy—and there would have been no invasion, or it would have been turned back with the loss of much blood. But the political leadership in Germany, in its short-sightedness and in complete misjudgment of the tenacity and mentality of the Anglo-Saxons and the potential war power of the United States in the background, had believed that the war in the West had already been won in 1940 and started out on the folly of the Russian war. The calls of us outsiders and "little" General Staff officers for aircraft and more aircraft and for new types were either not heard or they were laughed off.

We remained voices crying in vain in the wilderness. Promises were made to build up the largest air force possible after the close of the Russian war. Millions of soldiers were then to be released from the Army and were to be sent to the aircraft industry and to the German Air Force. Only the Air Force was to be built up. In the meanwhile, however, the air armament was put way down on the list: first were submarines, then came tanks, then assault guns, then howitzers or Lord knows what, and then came the Air Force. Meanwhile, the Russian war was eating away men, material, armament and planes and the only thing that remained for the Air Force was a promise that was never kept. Its task was to make sacrifices.

Let nobody claim that this complete failure of the Luftwaffe was the fault of the A.O.C.-in-C. alone. The Supreme Command, and its head, the Fuehrer, was as much to blame, if not much more so. . . . The Fuehrer decided the war aims himself, the distribution of the tasks and the armament. The Supreme Command's duty was to recognize and decide which branch of the Service would be most important in future operations in the decisive years and distribute the armament accordingly. The fact that the Luftwaffe claimed priority was considered by the Supreme Command to be a one-sided view of the Luftwaffe; perhaps it was not emphatic enough about its claims. The Supreme Command itself was too short-sighted for such far-reaching conceptions. Its mental horizon was too narrow, and how could it be otherwise? Few men there were able to think in terms other than those of the ground combat troops. The Fuehrer himself had repeatedly asked, "Why should Air Force leaders be required?" A general of another branch could lead the Air Force just as well. An infantry general had been in command during the world war. The Fuehrer told me that as late as April, 1945. What a view to take! It wasn't only that the production figures were not increased; new types of aircraft were not forthcoming either. At the end of the war we were still flying the same types, though highly developed, as at the beginning of the war. A failure of the air armament industry, although it would have to be determined whether this was due to inherent incapability within our own industry or whether it was a result of the structure and leadership forced on the industry by the State.

It is true that unheard-of inventions and progress were made in individual fields, far ahead of the rest of the world, but they all came too late and again because of the short-sightedness of the German High Command and of certain "know-alls" at the head of the German industry, they came in such small numbers that they could no longer be decisive. We were smothered by the enormous superiority of American and Russian material because the German High Command undertook too much on the ground in the East and because it did not direct the main weight of armament right from the beginning towards air supremacy and thereby safeguard Germany's vital zones and armament industry and ward off any attack from the West.

OUTLOOK AND THE FUTURE

Everything depends on air supremacy, everything else must take second place. The supremacy of the sea is only an appendage of air supremacy. Look at the development in the European war and the developments in the situation in the Pacific area. Even the strongest fleet is of no value if the enemy has air supremacy. It can no longer leave its ports or does so only to be destroyed. The country that has air supremacy and vigorously strengthens its air power over all other forms of armament to maintain its supremacy will rule the lands and the seas, will rule the world. The proper conclusions with respect to leadership and planning of armament must be drawn from this fact. A strong and indepen-

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dent Air Force command, put far above the others, or an Air Force command on equal footing with the command of the rest of the Armed Forces.

The requirements for maintaining air supremacy are decisive in all questions of organization, relative strength, allotment of manpower and supplies. All plans for the defence of a country, a continent or a sphere of interest or for offensive operations must be in the hands of the Air Force command. The Army and Navy commands are subordinate authorities. Although they cannot be done away with entirely, they must adapt themselves to all requirements in the air, which covers the entire world and extends to the high heavens.

The Air Force must be allowed to move its wings freely and must be relieved of the ballast of ground and naval forces. Future Supreme Commands must have Air Force officers in the decisive positions, men who can think in terms of the world and who have a wide horizon. Every soldier generally thinks only as far as the radius of action of his branch of the Service and only as quickly as he can move with his weapons. For this reason naval officers will rarely, and army officers almost never, be able to keep pace with the large-scale thoughts and wide horizons which the men of all air forces in the world have more or less acquired.

What a giant machine a corps with a number of divisions is on the ground! Fifty thousand men with thousands of vehicles and a great deal of artillery, a large command machinery, and it fights on a front of fifteen or twenty kilometres. A monster, and yet it is interested only in its neighbours on the right and on the left; what happens an army or two farther on is hardly noticed by the corps. But the Air Force officer sees much, much more and thinks farther; he thinks in entirely different channels. What is the large fighting front of a corps even to a little lieutenant flying long-range reconnaissance? The width of a thumb or no more. That is the way it is on the battlefield. How must it be in the High Command?

We have been beaten and eliminated, we have nothing more to say. But it will be interesting to watch the development of the Great Powers and the battle of wits. Will it be as it always has been, that they all, every one of them, will not learn from the past and will continue to make the old mistakes again and again?

GENERAL KARL KOLLER. *Born 22nd February, 1898. Entered the Army, August, 1914, transferring to the Flying Corps and training as a pilot, May, 1917. Served in the Bavarian Police Force, 1920-35. Transferred to the Air Force in August, 1935. In April, 1938, he became head of the operations staff of Luftwaffengruppe 3 (later Luftflotte 3) until January, 1941, when he became its C.A.S. Koller was appointed head of the Luftwaffe Operations Staff in September, 1943, and Chief of the General Staff in November, 1944, in succession to Kreipe, who had filled the post after Korten's death. Surrendered to the Allies in May, 1945.*

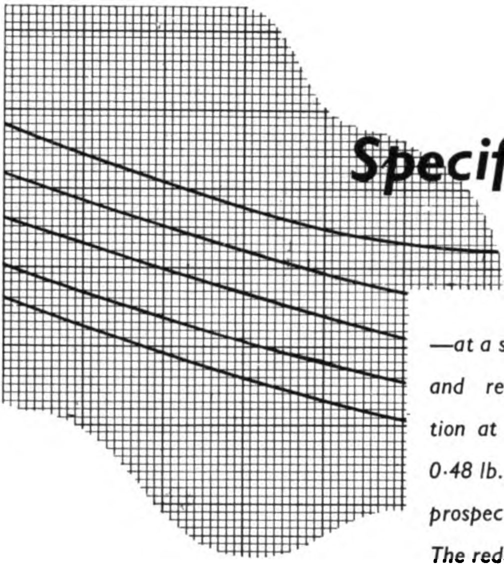
NEW BOOKS

Flight: A Pictorial History of Aviation. (Published by *Year*, 11833 Wilshire Blvd., Los Angeles, U.S.A.; $10.) Biggest and best of the histories so far published to mark the golden jubilee of powered flight, this book contains 1,000 pictures and 75,000 words of text on its 192 large (14 in. by 10½ in.) pages. It gives such an excellent over-all picture of aviation progress throughout the world since 1903 that one easily forgives the few mis-spellings and wrongly identified aircraft.

The Flying Years. By Lamont Buchanan. (G. P. Putnam's Sons, 210 Madison Ave., New York, U.S.A.; $5.) There are no pictures of A. V. Roe, Alcock and Brown, Whittle or the Comet in this history of flying's first fifty years. But, regarded purely as the story of aviation progress in America, it is quite interesting. In particular, there are enough new photographs to make it a valuable addition to the library of any collector.

The Eddie Chapman Story. By Frank Owen. (Allan Wingate Ltd., London. 10s. 6d.) Billed by a Sunday newspaper as "the greatest spy story of all time," this true story of a young Englishman who was twice parachuted into Britain during the war by the German espionage service is a first-class 10s. 6d. worth. It leaves many questions unanswered; but the discerning reader gradually begins to realize what a very brave man Eddie Chapman was.

The Winged Life. By Richard Rumbold and Lady Margaret Stewart. (George Weidenfeld & Nicolson, London; 16s.) When Antoine de Saint-Exupery disappeared whilst flying on operations over the Mediterranean in 1944, aviation lost one of its most talented writers. This biography by two of his friends will tell those who enjoy his books a little more about Saint-Exupery the pilot and author, without removing the fascinating air of unreality which surrounded Saint-Exupery the man.



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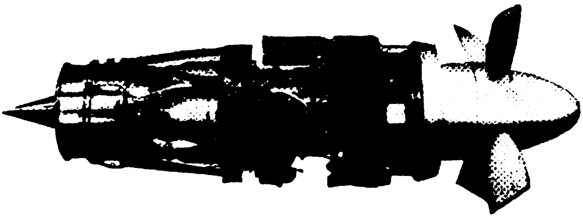

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Jet. By Sir Frank Whittle. (Frederick Muller Ltd., London. 16s.) This autobiography should be an inspiration to every Cranwell cadet, and an incentive to all the younger lads whom the Royal Air Force will need so badly in the years to come. Frank Whittle formulated his ideas on jet propulsion whilst at Cranwell. The aircraft which brought him well-earned recognition and reward first flew there in May, 1941. We can never have too many Whittles or books like this.

Tall Timber Pilots. By Dale White and Larry Florek. (The Viking Press, 18 E. 48th St., New York, U.S.A.; $3.50.) This is a glorious tale of the most dangerous civil flying operations in the world, among the beautiful, treacherous, densely wooded mountains of Montana and Idaho. Beginning in 1926 with air supply flights to tiny forest clearings, we read of the steady growth of the Johnson Flying Service on work ranging from air ambulance and air photography to "smoke-jumping"—a hazardous but effective way of combating forest fires that bred some of the first of America's Second World War paratroops.

My Political Life. By L. S. Amery. Vol. II: "War and Peace, 1914-1929." (Hutchinson & Co., London; 535 pp.; 32 illustrations; 25s.) In the opening chapters of his second volume of his memoirs Mr. Amery tells the story of his own experiences and activities in the First World War. In later chapters he contributes to the inner history of the years that follow, the break-up of the Lloyd George Coalition, Mr. Baldwin's rush election on the issue of Protection, and in more detail his own work as Secretary of State for the Colonies and for Dominion Affairs.

A Hundred Years of War. By Cyril Falls, sometime Chichele Professor of the History of War, University of Oxford. (Duckworth & Co. Ltd., London; 419 pp.; 20 maps; 30s.) This book provides a sketch of the past century (1850-1950) of warfare by land, sea and air, with a commentary in interpretation of it. The emphasis is always on the military aspects of war—strategy, tactics, weapons, administration, transport and new scientific developments—rather than on political and moral issues; though the author never loses sight of that progressive decline throughout this period which makes modern war so deadly a menace.

The Complete Air Navigator. By D. C. T. Bennett, C.B., C.B.E., D.S.O., F.R.Ae.S. (Sir Isaac Pitman & Son Ltd., London. 444 pp.; 30s.) This is the sixth edition of this book covering the syllabus of the flight air navigator's licence and useful as a text-book for students preparing to sit the examination for this licence. It is also of value to the practical navigator, as a reference book on mathematics, form of the earth, projections, D/F wireless, D/R navigation, astro-navigation and meteorology.

Introduction to Ultra-High-Frequency Radio Engineering, By Stephen A. Knight, F.R.S.A. (Sir Isaac Pitman & Son Ltd., London. 256 pp.; 21s.)

Pioneer of the Air. The Life and Times of Colonel S. F. Cody. By G. A. Broomfield. (Gale & Polden Ltd., Aldershot. 164 pp.; 30 illustrations; 10s. 6d.) This is the biography of one of the founders of aviation, with a personal background so colourful that it makes an amazing combination of Cody the crack shot and lasso expert and the bold adventurer in the early conquest of the air. If his colourful personality made him a somewhat spectacular showman, he proved himself to be, in the words of C. G. Grey, "a great man and a great gentleman." He was a wonderful improvisator and in his determination to fly "necessity was the mother of invention." The author's personal friendship with Colonel Cody has enabled him to give us an intimate picture not only of this picturesque character but also of his great achievements. This book adds another sidelight to the "Birth of Aviation" and is full of interest, offering as it does the details of his experiences in the Wild West, of his experiments with man-lifting kites, and of his final achievements as a pioneer of the air.

The Bridges at Toku-Ri. By James A. Michner. (Secker & Warburg, London. 136 pp.; 7s. 6d.) Another story of the Korean war centred round an American aircraft carrier and the lives of jet-bomber pilots aboard her, their operational missions and routine lives. The outstanding mission, the bombing of the bridges, a perilous and difficult task, is told vividly and gives an opportunity to portray what such targets demand from those detailed to destroy them.

Student and Private Pilots' Handbook. By H. H. Edwards, Honorary Flying Instructor to the Fair Oaks Aero Club. (Sir Isaac Pitman & Son Ltd., London. 100 pp.; 9 illustrations; 12s. 6d.) Mainly for students who wish to qualify for a private pilot's licence. It contains useful information on air law, navigation and meteorology.

The Mediterranean and Middle East. Vol. I.—History of the Second World War. By Major-General I. S. O. Playfair, C.B., D.S.O., M.C. With Commander G. M. S. Stitt, R.N., Brigadier C. J. C. Moloney and Air Vice-Marshal S. E. Toomer, C.B., C.B.E., D.F.C.; edited by J. R. M. Butler. (Her Majesty's Stationery Office, London. 506 pp.; 44 photographs; 20 maps in colour and 10 other maps or diagrams in the text; 35s. net.)

There are also 10 Appendices and a comprehensive Index.

This is the first of six volumes which are to cover the campaigns in this theatre from 1939 to 1945. The close co-operation of the three Services in a campaign directed by their respective Commanders-in-Chief, in equally close collaboration, is here prescribed as a joint story.

The first volume deals with the growing tension in the Middle East; the uneasy months of war with Germany while Italy remained an unfriendly non-belligerent; Italy's entry into the war; the serious consequences of the collapse of France and including the regrettable but necessary action against the French Fleet at Oran; the encouraging start of the struggle at sea; the early encounters on the borders of Italian East Africa; and the Italian advances into Egypt and Greece.

This follows the account of the first British offensive in the Western Desert which ended with the destruction of almost all the Italian land and air forces in Cyrenaica. The shadow of the coming Greek campaign can soon be discerned and the events leading to the decisions concerning Greece are fully described.

All this time the British had been doing their utmost to strengthen their forces; a cycle of ocean convoys was instituted from the United Kingdom round the Cape, and from India and beyond; the air reinforcement route across Africa was opened; and operations were conducted to cover the passage of warships and merchant vessels through the Mediterranean itself. The effect of the arrival of the Luftwaffe is described and the further efforts of the Germans to stiffen their shaken ally are referred to, but the results are left for the next volume.

The book ends with the campaigns based on East Africa and the Sudan, in which East Africa was wrenched from Italian control, the Emperor of Ethiopia restored to his throne, and the threat to the passage of convoys in the Red Sea finally removed.

PIONEER OF THE AIR

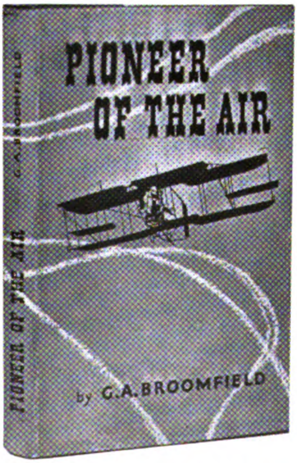
THE LIFE AND TIMES OF COLONEL S. F. CODY

BY G. A. BROOMFIELD

With a Foreword by
Sir Geoffrey de Havilland, C.B.E., F.R.Ae.S.

SAMUEL FRANKLIN CODY is a good subject for a biography. Born at Birdville, Texas, U.S.A., in 1861, of Ulster stock, he became a buffalo hunter and a superb horseman. At length he came to Europe and, after a chequered interlude as a showman and writer of melodramas (in which he also acted), started his career in aeronautics—first with kites, and then aeroplanes. The crowning moment of his life—his triumph in the Military Trials Competition against some of the best opposition the world could produce—came after many bitter disappointments which would have broken a lesser man. Always colourful, he somehow gripped the popular imagination, and held it until that day in August, 1913, when Sir Geoffrey de Havilland "heard his aeroplane flying, and then suddenly all was quiet." "I never looked upon Cody as a trained engineer," says Sir Geoffrey, "but he was a wonderful improviser with tremendous faith in his own ideas, and, after all, his aeroplanes did fly, and that at a time when many machines that might be claimed to be more 'scientific' did not fly."

The author was a lad when he met Cody, and formed an association with the airman which was to last until Cody's death. He gives an intimate picture of a picturesque character based on an unrivalled knowledge of Cody's background, problems and achievements. To illustrate his book he has drawn on many sources, and the photographs he reproduces form an adequate complement to his text.



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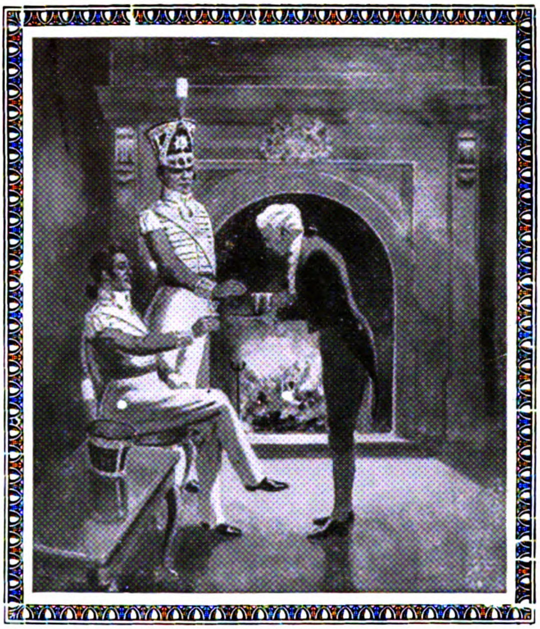

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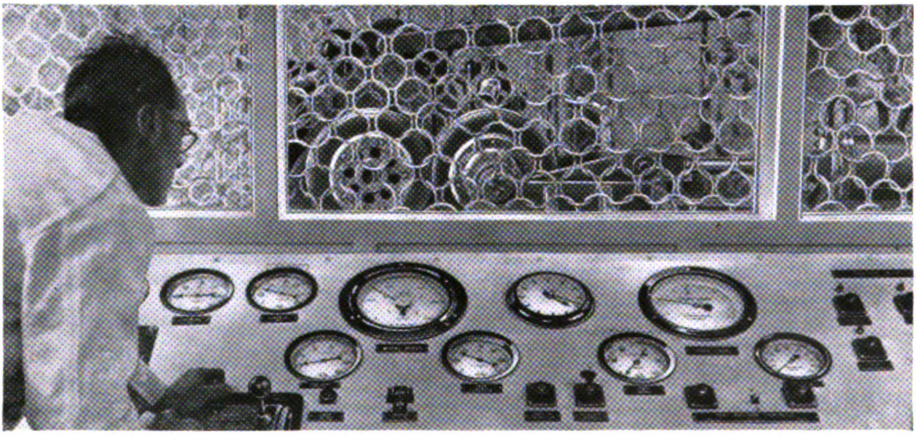
NEW TYRE-TESTING MACHINE REPRODUCES HIGH-SPEED JET OPERATING CONDITIONS

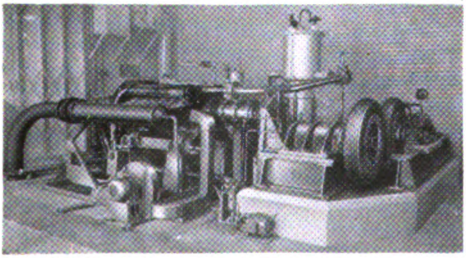


Controlling the progress of an actual test run. The machine can be seen through the double wall of safety glass, beyond the protective steel torpedo netting

PERMITS CLOSE, ACCURATE STUDY OF AERO TYRE BEHAVIOUR

The startling progress of aeronautical design in recent years, so greatly influenced by the development of the jet engine, has confronted the tyre designer with complex problems. Thinner wing sections, which reduce retraction space, create a need for smaller-section tyres. But they also indicate higher performance—and a correspondingly bigger strain on wheel equipment. Just how successfully Dunlop has overcome these problems may be judged by the wheel equipment now fitted to the "Comet," the "Viscount" and many other advanced Civil, Military and Naval aircraft.

An indispensable aid in all this work is test equipment capable of simulating actual operating conditions—both as they are now and as they are likely to be in the future. Here Dunlop has a unique advantage—a test machine that reproduces, for close and accurate study, the complete life-cycle of a high-speed jet aircraft's tyre. Mounted in a specially-constructed, well-protected building, the new plant is powered by a Rolls-Royce Merlin aero engine developing 1,725 b.h.p. at 3,000 r.p.m.—equivalent, with some tyres, to a surface speed of 300 m.p.h.



The test plant, showing the Merlin engine, the test-tyre and, on the far side, the 'slave' tyre and pneumatic ram.

Sudden Strains and Stresses

To reproduce the effect of a loaded tyre travelling over a flat surface, the test tyre is driven against a freely-rotating tyre "spring-loaded" by means of a compressed air cylinder. To imitate a take-off the driven tyre is rapidly accelerated under a gradually-reducing load. For landing, the tyre is rotated at high speed and the 'slave' tyre is pressed suddenly against it under a load of up to 7½ tons. This load is then momentarily withdrawn, to simulate landing 'bounce', and then re-applied for a longer period in imitation of the taxying run. The whole sequence of operations is automatically timed and controlled.

This new machine is undoubtedly a complete step forward in aero tyre testing. Already it has yielded information which is readily translatable into terms of safer, more economical aircraft operation. This valuable data is now being applied in Dunlop designs. By anticipating the needs of the future in this and many other ways Dunlop offers a complete service to the Aircraft Industry.

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[National Defence Photo

THREE OF A KIND

On hand to greet Air Marshal C. Roy Slemon, R.C.A.F. Chief of Air Staff, when he arrived recently at Washington National Airport, were General Nathan Twining, centre, and Air Chief Marshal Sir W. F. Dickson, Chiefs of Staff of the U.S. Air Force and R.A.F. respectively.

EDITORIAL

WESTERN POWERS' DEFENCE POLICY

AFTER a long period of indecision and drifting along the path of a "bow-and-arrow" policy, that of preparing to meet aggression by direct local opposition at a time and place selected by the enemy, a more modern policy, one in keeping with this "atomic age," now seems to be emerging.

Lately there have been indications that those responsible for the joint defence of the Free Nations are in favour of a policy built *primarily* upon their great capacity for swift "massive retaliation" by means available to them and at places of their own choice.

From observation of the recent *selective* building-up of the three arms of the Services, each in accordance with the functions that would be expected of them under the changed conditions of warfare, it is obvious that the ability to deliver swift atomic retaliation is not, *by itself*, thought to be adequate to meet *all* our needs in defence if attacked. Clearly, the new policy emerging does not subscribe to the suggestions sometimes put forward that a major war of the future could be won by an air power alone.

It indicates that the Western Powers intend to build up their defence forces with the most modern weapons in all three Services, *in selective strength* for each; the predominating factor being that the best method of defence today is the power of delivering, simultaneously with an enemy's attack, overwhelming retaliation of a scale of unprecedented destructiveness, whilst other components of our air forces carry on the fight for air supremacy in defence of our own bases and immunity of our vital sea-routes, against the 22,000 aircraft (plus) that the Russians could use in such attacks.

Such retaliation must of necessity be both tactical and strategical, with the aim of immobilizing the aggressor's vast military forces, both working in unison in atomic attacks upon bridges, railway marshalling yards, concentration of ground forces, ammunition and supply dumps, airfields and the atomic destruction of every possible military target in Russia and her satellites by a strategic bombing force.

It must be obvious that for such a stupendous task air power must predominate in strength over other Services for the implementation of this policy, and equally clear that surface forces, although vital for other aspects of defence, will take a lesser part than they did in the old traditional form of warfare and must of necessity now become ancillaries. A readjustment to obtain the correct balance of strengths of the three Services and their close integration *as one united Defence Force*, should be achieved as speedily as possible — as the moment when the threatened aggression is likely to be launched cannot be predicted in either days, months or years.

It is unfortunate that the present success of Soviet strategy, aimed at the dispersal of our military strength to various parts of the world, will delay the achievement of properly balanced forces and give us the added burden of maintaining more surface forces than are necessary to meet the main threat in Europe.

We must emphasize that we do not believe that the new policy is intended for anything other than a major war and that it would be unsuitable for small wars, such as those in Indo-China or Malaya, where attempts at Communist absorption of more small countries is being made.

In order to prevent these unfortunate peoples from falling under Soviet domination and the harnessing of their resources to the U.S.S.R. machine, the Free Nations policy continues to be to localize these small wars by the older traditional methods. If China finally intervenes more openly and in greater strength in Indo-China it seems likely that some modified form of the policy for a major war might be put into force.

Until some other means of settling the differences between the Communists and the Free World, other than by military strength, can be evolved, both East and West will continue to shoulder the intolerable burden of unprecedented armed forces.

For the Western Powers there is no other choice while Russian military might* threatens each and all of them with absorption into Communistic slavery. It is a heavy burden to bear, but freedom is dearer than life itself.

In the meantime we must continue to lead in the inventiveness of modern weapons, superiority of the arms and greater efficiency of our numerically weaker forces, the maintenance of their high standard of training, the flexibility of our forces and their instant readiness at any moment of any day of any year to leap into action to smother by "massive retaliation" any military aggression by the U.S.S.R.

The Communists should not be left in doubt as to our intentions, the knowledge of which and of our ability to deliver such swift retribution is likely not only to postpone such aggression, but to gradually bring us to a position of stalemate in the building up of forces of destruction. There is the hope that from our position of strength the burden might be lifted earlier; that it might lead us both into the saner paths of *bona-fide* peace conferences, to a disarmament at least to a scale for each Power that would remove any threat from any quarter, and finally, to what the peoples of every nation seek more earnestly than anything else, a real guarantee of "Peace in our time"; for our children and our children's children.

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* Following figures given by Mr. Nutting, Under-Secretary, Foreign Office, in form of written Parliamentary reply on 10th May, 1954:

AIR.—20,000 aircraft; fighters, 100 per cent. jets; light bombers, two-thirds jets (800,000 men). Plus *Satellites*: 2,000 aircraft; 50 per cent. jets (90,000 men).

ARMY.—175 divisions; includes 30,000 tanks (3,200,000 men). Plus *Satellites*: 80 divisions (1,210,000 men).

NAVY.—350 submarines; includes 50 per cent. of large or medium ocean-going type (750,000 men). Not mentioned were the twenty cruisers and 100 destroyers, more details of which were given in our spring number.

These figures we consider to be a very conservative estimate of the Soviet military might. —Editor.

TO SURVIVE *AND* WIN

A PLEA FOR AN UNBALANCED FORCE

By Group Captain J. N. Tomes, C.B.E.

THE expression "defence forces" arose and was much in vogue between the wars. It arose out of the desire to demonstrate that we had no aggressive thoughts and that our only reason for having an Army, Navy and Air Force was to enable us to respond to any attack that might be made upon us. The thinking behind the expression was both limited and weak, and we still suffer from the effects today. The very fact that we were ever armed at all was an admission that we considered attack to be at least a possibility. But so obsessed were we with the bad form of thinking aggressively that the word "defend" became, and has to a frightening extent remained, synonymous with ward off. In other words, we had no serious thought of winning a war; we merely planned for survival. And the word "attack," instead of being synonymous with defence, came to be regarded as something almost unmentionable.

Thus, our thinking was limited because we prepared to ward off, but not to win when the fact of our preparing at all indicated our belief in the possibility of attack. Our thinking was weak because, although there could conceivably be some moral excuse for saying that—if we were not prepared to go so far as to offer the other cheek—we would anyway do no more than ward off the blows, there could never be any justification, moral or military, for believing that our policy could ever meet the prime requirement of all, namely to keep us out of war.

Wisdom is easy with hind-sight, but by 1936 the way ahead should have been clear. It was all in *Mein Kampf*. Our whole rearmament rush was because of Hitler; but, instead of trying to stop him, we armed to be able to ward him off when he attacked. We put the emphasis on our close defences and we continued to proclaim, with an obstinacy and sincerity that forces admiration, that we would never be aggressive. Whereas, the one thing that might have halted Hitler in his tracks would have been an uncompromising statement of our aggressive intentions under certain stated eventualities and a clear demonstration of our ability to carry them out. But no. We concentrated on our close defences and then, having made our weakness clear, to our great moral credit we went to war.

Two world wars have given a sharper intensity and a greater urgency to policy, but they have not changed our basic creed in international affairs. Our creed, surely, is that under no circumstances will we ever start a war; we will however, go to the extremist lengths consistent with honour to prevent one. Should we fail in this and should war nevertheless be forced upon us, our simple aim would be to win.

If this creed is accepted—and few will dispute it—we should ask ourselves whether our military policies and plans are really such as will give us what we want. Will they prevent war, and will they enable us to win if, despite everything, prevention fails?

It would not be true to say that we are in the same mental state militarily as we were in the 1930's, when the requirements of close defence were placed before all else. There is today a clear, and one hopes growing, appreciation of the importance of the attack; the "V"-bomber programme is witness to this. But it is the writer's belief that, although we are thinking differently than we were twenty years ago, we are still thinking just as dangerously. The danger then was that we were going in one and the wrong direction; the danger today is that we are trying to go in too many directions.

We have three choices. We can give priority to close defence; we can give priority to defence through attack; or we can aim for both. The last of these choices is the ideal militarily, because it provides a double insurance, but it is only ideal if we can build up and hold ready a sufficient strength in both fields; half strengths simply will not do. For obvious economic reasons this can never be achieved, and because, despite the facts, we are still attempting to achieve it, we are forced into compromise with its inevitable result that we are dangerously under-capable in both spheres.

In effect, then, we have only two choices. Should we concentrate priority on close defence or on attack defence? If we choose the former we must straightway face up to two major implications. The first of these is that to all intents and purposes we forgo actually winning a war in so far as winning means imposing our will on an enemy; our war aim becomes the somewhat negative and colourless one of keeping things just as they are. The second implication is that we must be able to achieve a sufficiency in skill and numbers either to deter an enemy from ever starting a fight, or to guarantee that the scale of attack received will never exceed that judged to be the maximum that the country's economics and people can absorb. Only those few who know all the facts could say whether such a guarantee could ever be given, but the course in any case stands convicted by the fact that it can never bring true victory. None will dispute that this can only come as the reward of attack, and few will deny that an enemy is more likely to be deterred from war by the certainty, and it must be a certainty, of devastating attack on his homeland rather than by the mere possibility that he may lose even a substantial part of his bomber force.

It seems, then, that an uncompromising insistence on priority for the weapons needed for the attack is the only means by which we can have a reasonable chance of satisfying our creed—to prevent if possible, to win for sure. The case for close defence priority rests mainly on the need to be able to ward off during an alleged offensive development period—sometimes called, viewed from another angle, the survival period. The argument totters, however, if this period—whatever its purpose may be—can be shown to be non-existent.

At this point we should study the commodity, time. We are often told that one of the main lessons of the Second World War was the fact that it takes a very long time to build up a real bomber offensive capability. (The reference is normally to a bomber offensive, but the argument applies equally to other offensive arms). Time, we are told, is needed, to produce the aircraft, the equipment and the bombs, to find and train the air and ground crews, to build the airfields, to study and determine enemy targets, and, above all, to gain such air superiority as will permit our bombers to do their job. All this is, of course, as a statement of last-war fact, true. What is much less certain and not necessarily true is whether the correct lesson is being drawn from these facts, or indeed whether they constitute a lesson at all. In reality, it is suggested, the lesson derives from only the last few days of the war, for Hiroshima erased in a few seconds most of the validity from conclusions drawn from the previous five years. And the lesson, surely, is not that many years of time will be needed, but simply that there will be no time. Fighting of various kinds may drag on for a long period, but it will merely be to confirm an issue already determined.

There is nothing novel in this proposition. It has in recent years been stressed often and by many distinguished people. Only two examples will be quoted here. Sir Robert Saundby has written: "Atomic bombs are likely to be used in a carefully worked-out plan, calculated to destroy at the outset the war potential of an enemy and to bring about the collapse of the civil administration." And more recently, Lord Balfour of Inchrye: "Our ability to prevent continued atomic raiding of Britain's cities and bases depends upon having on instant call a highly efficient, adequately manned, strategic counter-bomber force of sufficient size." The operative phrases in these statements are, of course, "at the outset" and "on instant call."

With the Japanese example before us, and with the almost monthly detonation of this kind and that kind of atomic improvement, there should no longer be need to argue the truth of these and many other similar statements. No expert knowledge is needed to enable one to look at a map and appreciate how few and compact are the vitals of this country, and one has only to impose on these the destructive power already demonstrated in 1945 (child's play, we are told, compared with what can be done today) to see that the survival period must be measured in hours, or at most days. If we give priority to our close defences, it will assuredly mean that our attack forces will at best be at half capability, able neither to prevent nor win. Under such conditions an offensive development period will indeed be required; it will be required, but it will not be granted us because, however much priority the close defences receive, it is difficult to believe—and this is the kernel of the argument—that they will be able to give us, in terms of either immunity or time, such a breathing space as would be needed by only partially developed attack forces. Even if a comparatively long breathing space could be gained, a highly doubtful hypothesis, there would on the most optimistic basis be no physical capacity left beyond that needed to ensure the continuance of the close defence.

It has rightly been said that a military establishment which is expected to fight on after a nation has undergone atomic attack must do so with the men and equipment already mobilized. If sound plans are made now, however, it should not be impossible so to site, disperse and organize at least the bomber element of our attack forces that it is geographically removed from, and for a period in all respects independent of the urban centres against which the enemy atomic offensive is likely to be launched. It was M. Vishinski who so truly pointed out that the lesson of the atomic bomb is that in future the man who has received a mortal blow can still retain the ability to kill. If, then, as seems probable whatever we do, the rest of the country is going to be very nearly knocked out, we should surely be better off partially knocked out but still capable of dealing a mortal blow, rather than a little less knocked out but capable only of hanging on for a while longer. Despite this, the national attitude seems to remain one of either blind hope that it will not really be so bad on the day, or alternatively one of simple nostalgia for the well-understood warfare of the past.

The writer suggested earlier that, through our efforts to satisfy too many needs, we were in danger of being too weak everywhere. An even greater danger it seems, is that of being both weak and late. Most allied forces—air, land and sea—are based on the principle of an expanding nucleus; that is, one has a fairly small and basic peace-time force upon which one builds a theoretically rapid expansion in war. Somewhat allied to this is the respectable and long-accepted view that the shop window is dangerous, that front-line strength is all very fine, but that backing is even more important.

The true position was summed up by the U.S.A.F. General Spaatz a few years ago when he wrote, "We shall stand or fall with the air forces available in the first crucial moment." Why, then, do we and our allies continue to adhere to the expanding nucleus policy? The reasons, it is suggested, are partly military and partly political or economic.

The only apparent justification on military grounds for the nucleus policy can surely be a doubt as to our ability to produce an effective deterrent, coupled with a belief that the next war will last long enough for much of it to be fought along hitherto conventional lines, and that the second, possibly conventional, phase warrants more attention in planning than does the opening, decisive phase. Yet, to produce an effective deterrent is certainly not beyond allied capability; it is simply a matter of bold decision and ruthless application of the right priorities. And to believe that the decisive phase of the next war will last long is to be out of tune with post-atomic facts and thought. One is forced to conclude that, from the purely military point of view, present policy must spring mainly from convention—the convention that it always has been thus and that wars have always lasted a long time; that Britain has always managed to hold on until she has gathered and backed her strength; that the white cliffs of Dover still stand guard and that the people must see the guns.

The politico-economic argument is more obvious, more plausible, and just as conventional. It usually runs as follows: "Offensive forces alone cannot *guarantee* either the prevention or winning of war; we must therefore have an insurance and, in any case, the security of the base is one of the principles of war. Also, the public would never stand for the scrapping or reduction of their close defences. But we cannot possibly afford both large attack forces and a reasonable amount of insurance, so we had better plan to stave off the enemy and then see what we can do about building up attack forces." This argument, and in particular the last sentence, has been largely answered already. It is true that nothing can be *guaranteed,* but air attack always carries with itself a markedly greater probability of success than can ever normally be expected of close air defence. Furthermore, if offensive forces alone cannot guarantee either the prevention or winning of war, still less can this be achieved through a Jack-of-all-trades policy; it is surely better to concentrate on one essential and have a good chance of success, than to have a bit of everything and be virtually certain of failure. There would, it cannot be doubted, be a great public outcry if the close defences were reduced by three-quarters in order that Bomber Command could be doubled, but it is after all the duty of the nation's leaders, with their greater knowledge, to form and lead public opinion rather than bow before it. The principle of war of the security of the base will always be sound, but it is not a part of that principle that security must be achieved through close defence.

A radical change in planning attitude of mind seems needed. Defence planning today, at any rate in theory, appears to start from the question, "How strong, in terms of ability to deliver bombs accurately, is the possible enemy?" If, the argument continues, this strength were set against us, how much of it could we accept and still be able to assure a minimum standard of living, a continuance of close defence and a build-up for an eventual and victorious counter-attack? The difference between what may be set against us, and what we reckon we can accept, is the scale that we have to stop, and, were true priority given to close defence, it would be planned to have the strength and skill necessary to achieve this; only after this would effort be made available for other things. This would be at least logically, if not strategically sound. In practice, however—possibly as the result of discovery that the strength and skill needed are unachievable—the proposition is at some point abandoned, a main aim is sacrificed before the insistence of other demands and refuge is taken in a let's-have-a-bit-of-everything policy.

The question that should be asked is not how strong, but how weak is the enemy in terms of what *he* can accept?

To recapitulate, we arrive at six fundamental premises:

First.—Our national defence creed is to prevent war if we can; otherwise to win.

Second.—A deterrent can only deter if it makes itself known, and if it is immediately and actually capable of doing what it threatens. (The one thing likely to encourage an aggressor to take a chance would be the knowledge that he had not got to worry for a while about full retaliation.)

Third.—The war will be decided by what we have at the start.

Fourth.—Half measures are no good; we must go the whole hog.

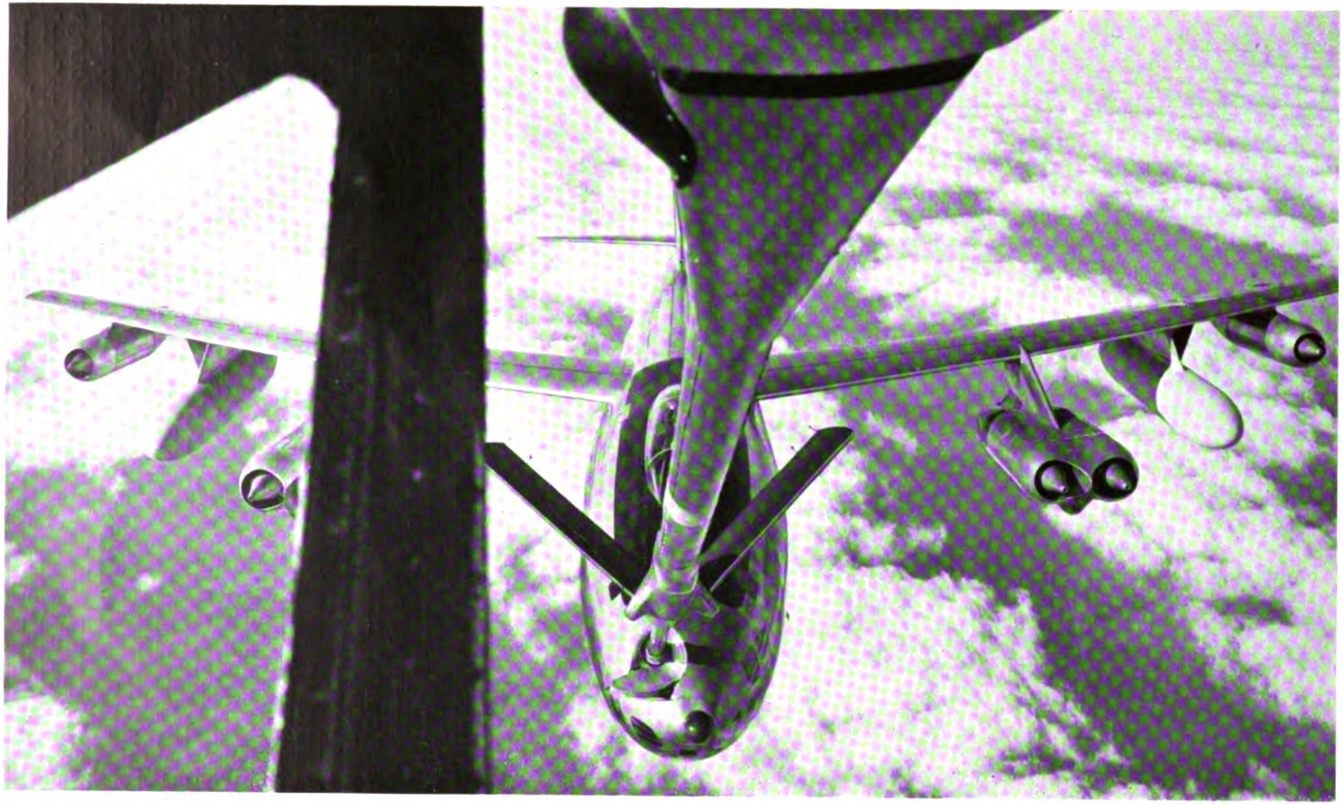
Fifth.—We cannot afford full measures all round; so we have to decide between close defence or attack defence priority.

Sixth.—Attack defence gives the best hope of prèvention, and the only hope of winning.

Accepting these premises, we can take the above question, "How weak is the enemy?" as the starting point of a defence policy. The question is not an easy one to answer, but it is no harder than its alternative. It must be answered as accurately as our intelligence can permit, and a considerable factor then applied for error. Having determined this data (which, being variable, must of course always be under review), we should direct all defence planning and effort towards producing and maintaining forces able to deliver a scale of attack well in excess of that judged the maximum that any probable enemy could accept. In carrying out this policy we shall require great singleness of mind; there must be no looking over the shoulder, and we must be quite ruthless in relegating lower down the scale everything that does not contribute directly towards our purpose. Our plans should be drawn up on an assumption of "no time," the *whole* power needed to attain our aim being available and standing ready at all times when danger threatens. Finally, we must change our attitude regarding security; there can be no deterrent unless the person at whom it is aimed is aware of what threatens him and is convinced of its ability to do him the harm it professes; we should proclaim our intentions and our capabilities.

One criticism must here be met—the criticisms of the man who says, "Supposing the enemy adopts the same policy, supposing he takes our measure and goes all out for the offensive, what then?" The answer is that the enemy will, if he has any strategic sense, certainly do this, but it need disturb us only if we have ourselves failed to follow a similar policy. So long as we can at immediate notice deal a greater blow than an enemy is willing to accept, the fact that he can do the same to us is in a sense irrelevant. We shall be in a state of double deterrent and almost certain, if expensive, peace.

An attempt has been made to argue the case for priority for the offensive generally, rather than for any particular offensive arm. If the argument has been related mainly to air forces, this is simply because the R.A.F. is the writer's Service. The principle of priority for the offensive is the first thing that should be established; the actual form of the offensive is a second step and another theme. It is suggested, however, that acceptance of the principle brings with it a need for an integration of defence policy in the form of a national supra-Service attack plan. This plan would be the authority for stating beyond all dispute what arms were to receive absolute priority by virtue of their deterrent and war-winning roles, and for allocating remaining resources between other claimants.



[Photo: Courtesy of the Boeing Airplane Company

BOEING FLYING BOOM REFUELLING

A B-47 Stratojet takes on a load of jet fuel from a KC-97 Stratofreighter Tanker Transport; seen through the refuelling operator's station in the KC-97.

IS FLIGHT REFUELLING WORTH WHILE?

BY JOHN W. R. TAYLOR

ONE day in April, 1954, a B-47 Stratojet bomber of the United States Air Force circled helplessly 30,000 feet over Oxford while its crew struggled to free its undercarriage, which was jammed in the retracted position. With sufficient fuel for only thirty minutes' flying, the pilot was faced with the alternatives of trying to make a high-speed belly landing at his base in Gloucestershire, or of bailing out. In either case, even if no lives were lost, the $2 million aircraft would be destroyed.

In fact, the incident had a much happier ending. Ground controllers called up the U.S.A.F. base at Mildenhall in Suffolk and, within minutes, a KC-97 Stratofreighter transport fitted with flight refuelling equipment was speeding towards the crippled bomber. When the aircraft made contact, only seven minutes' fuel remained in the B-47's tanks; but it was enough. Within three minutes some 5,000 gallons of fuel began to flow through the "flying boom" pipe linking the two machines. No longer racing against the fuel gauges, the B-47's pilot eventually succeeded in getting the wheels down, and the bomber was able to make a safe, normal landing at Fairford.

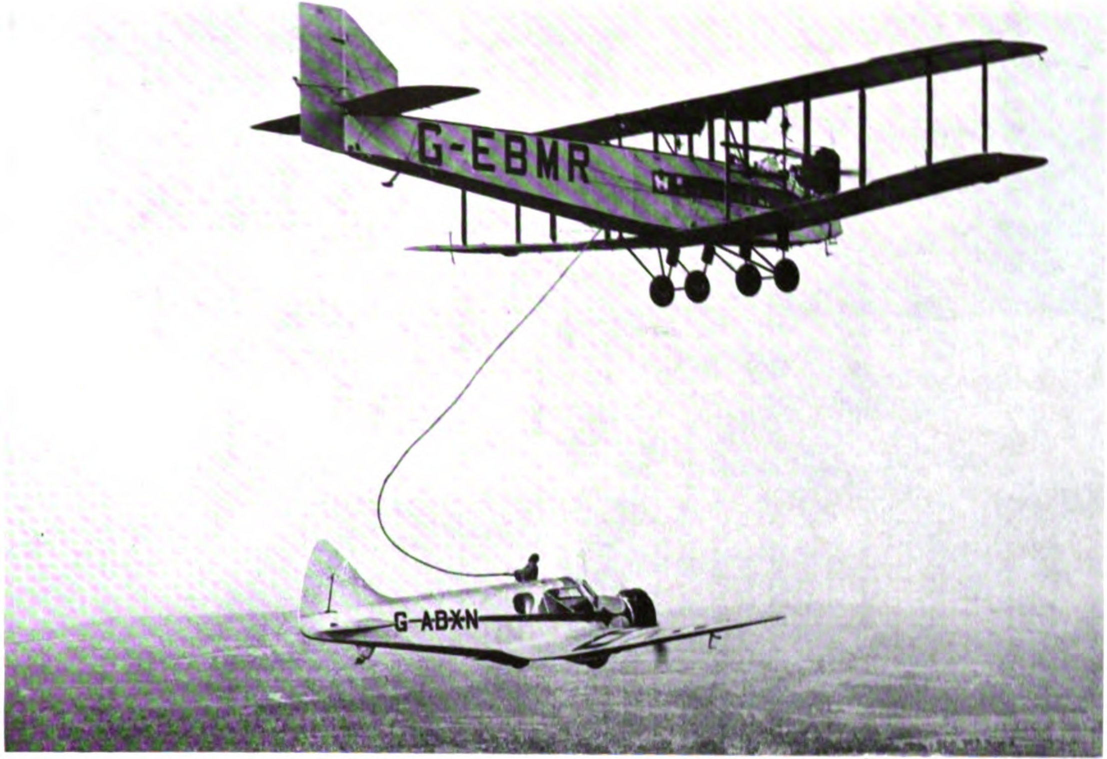
It is not often that the value of flight refuelling can be shown in such a dramatic, indisputable manner; but few people in Britain seem to realize the importance that the U.S.A.F. and U.S. Navy attach to the technique, or of the scale on which these two Services use it as a day-to-day routine. On average, the U.S.A.F.'s Strategic Air Command alone make a mid-air refuelling contact every fifteen minutes, twenty-four hours a day, seven days a week. The U.S.A.F. as a whole completes about 7,000 flight refuellings each month, transferring 1.2 million gallons of fuel in the process.

No mere emergency operation, it plays an important part in the Service's strategic and tactical planning, bringing every target in the world within range of U.S. bomber fleets, for the endurance of a flight-refuelled aircraft is limited only by its pilot's ability to stay awake and alert. An early indication of its effectiveness was given in March, 1949, when a B-50 Superfortress bomber *Lucky Lady II* flew 23,452 miles round the world non-stop in ninety-four hours, refuelled four times *en route* by KB-29 tankers.

Even then, the technique was by no means new. It had started as a stunt to amuse crowds at U.S. air displays in the early twenties—the first recorded example involving nothing more than passing a can of fuel from one aircraft to another in mid-air on 12th November, 1921.

More serious experiments were made in 1923 at Rockwell Field, San Diego, California, where the Officer Commanding at the time was Major (later General) H. H. Arnold. Three D.H.-4B's of the U.S. Army were modified for the experiments. Two equipped as tankers, with fifty-foot lengths of hose; the other, receiver, aircraft had extra fuel tanks installed aft of its twin cockpits, with large openings in the top to accommodate the hose.

In the first test on 20th April, 1923, two of the D.H.-4's remained in contact for more than 40 minutes, but no fuel was passed. Further experiments followed, and on 27th August, Lieutenants Lowell Smith and John Richter remained airborne for 37 hrs. 15 min. 14 sec. in the receiver aircraft, covering 3,293 miles and establishing fourteen world distance-endurance records for refuelled flight.



[Photo: Samson Clark, London

England—India non-stop attempt. Squadron Leader Helmore holding the nozzle from the Handley Page W.10 Tanker into the fuel tank of Sir Alan Cobham's Courier.

AIRBORNE FOR TWENTY-SEVEN DAYS

Five months later, the first air refuelling in Europe was made at Le Bourget, France, by Captain Weiss and Adjutant Vancoudenberg, who transferred twelve gallons of fuel from one aircraft to another at 10,000 ft. But then there was a lull until 1929 when the U.S. Army Air Corps Fokker monoplane *Question Mark*, commanded by Major Carl Spaatz, remained airborne for 150 hrs. 41 min., during which fuel, oil and food were passed from two Douglas biplanes.

Inevitably, a host of U.S. private flyers set out at once to beat the Air Corps' record, for this was the age when fortunes could be made by squatting atop a flagpole longer than anyone else, or pushing a peanut with one's nose from city to city. Prize money and gifts of up to £40,000 could won by remaining airborne for long periods, and by the end of 1930 the record stood at 647½ hours, held by Dale Johnson and Forest O'Brine, who stayed in the air in a Curtiss Robin from 21st July to 17th August.

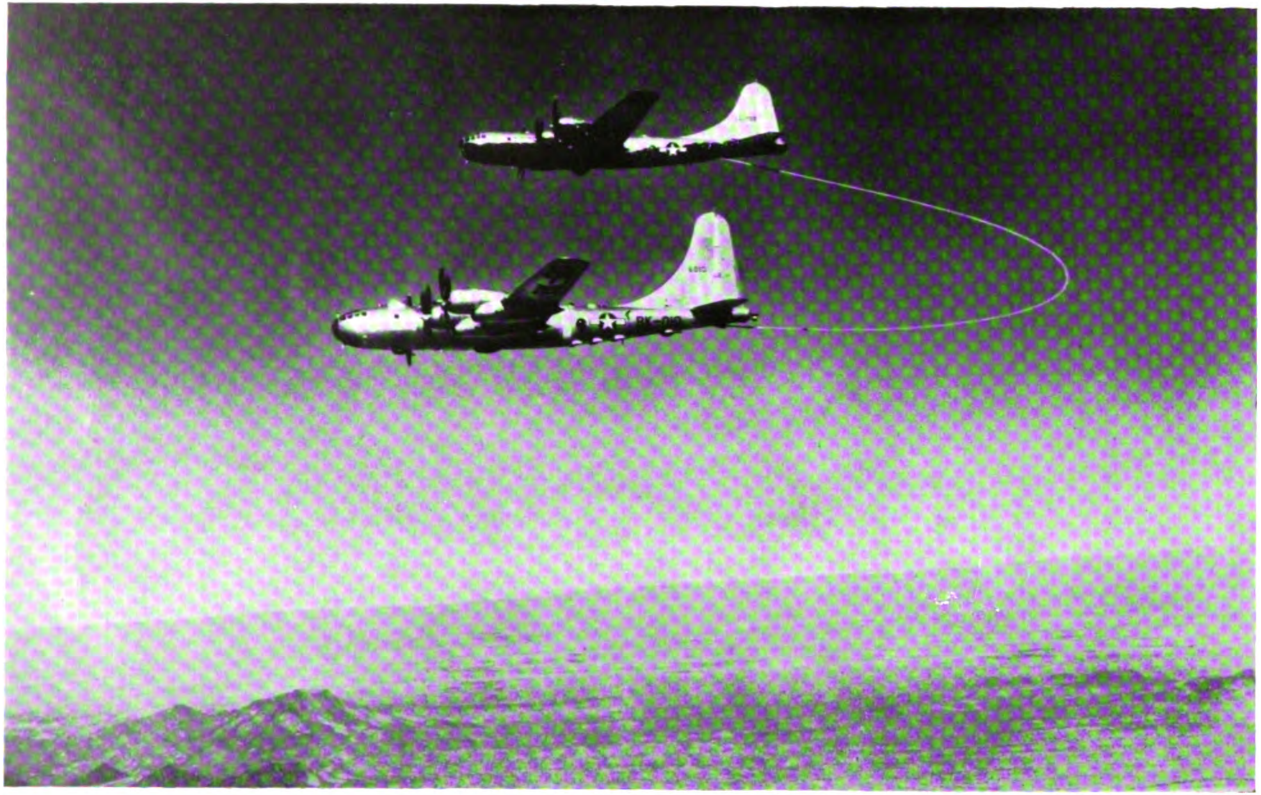
Such flights proved little beyond the reliability of the aircraft and their engines; but they paved the way for more serious experiments. First real progress was made by Squadron Leader R. L. R. Atcherley of the Royal Air Force, who had been impressed by the possibilities of flight refuelling during a visit to America to take part in the National Air Races. As soon as he returned to his squadron in Transjordan he began experiments to perfect a safer and simpler method of making contact between tanker and receiver aircraft, the result being the well-known "looped hose" technique, which remained in use for many years.

In Atcherley's method, the aircraft to be refuelled trailed a 300 ft. long horizontal line, to the end of which was attached a three-pronged grapnel; whilst the tanker aircraft trailed a 100 ft. weighted line. The procedure was for the tanker to approach from behind the receiver, in a position slightly above and to one side, and then to drift across until the two lines crossed. The receiver aircraft then hauled in the lines and the hose-pipe from the tanker.

It was at about this time that Sir Alan Cobham, the greatest exponent of flight refuelling, entered the picture. After experiments with two D.H.-9's, he attempted a non-stop flight from England to India in an Airspeed Courier, which was to be refuelled in flight over England, Malta, Alexandria and Basra. Unfortunately, a broken throttle linkage forced him to give up at Malta; but the flight was of great importance in that it was the first time flight-refuelling had been used to take advantage of the fact that an aeroplane can fly at a greater all-up weight than it can lift off the ground. The Courier had a designed maximum take-off weight of 3,700 lb., and a maximum flying weight after refuelling of 5,050 lb.

TRANS-ATLANTIC AIR MAIL MADE POSSIBLE

Obviously, the ability to take aboard fuel loads of such an order after take-off offered tremendous possibilities; and Imperial Airways soon saw in it a means of operating non-stop commercial services across the Atlantic. They sponsored development work by Cobham's newly formed company, Flight Refuelling Ltd., which set up drawing offices and workshops at Ford Aerodrome and took over the development work that Atcherley had continued at Farnborough. With Air Ministry support, two Virginia bombers were equipped for flight refuelling and demonstrated to Imperial Airways, who eventually decided to give the technique a trial and ordered flight refuelling equipment to be installed on two of their modified "C" class flying boats, *Cabot* and *Caribou*.



[U.S. Air Force Photo

ROUND THE WORLD NON-STOP
"Lucky Lady II" being refuelled by a B-29.

Two of the earlier "C" class boats—*Caledonia* and *Cambria*—had made the first airline flights over the North Atlantic in 1937, but had had to carry so much fuel that they could not lift mail, freight or passengers as well. Flight refuelling altered all that, and *Cabot* and *Caribou* made sixteen scheduled Atlantic crossings in 1939, carrying airmail, on fifteen of which they were flight refuelled over the Irish Coast or Newfoundland by Harrow tankers. They took off at a loaded weight of 46,000 lb., and received an "overload" of 1,000 gallons of petrol when they reached cruising height. The method used was basically similar to Atcherley's, except that the aircraft to be refuelled trailed a weighted line, across which a line from the tanker was fired by a sort of "harpoon gun" and became gripped by a grapnel. The line was then hauled into the tanker and replaced by a hose, which in turn was hauled across to the receiver.

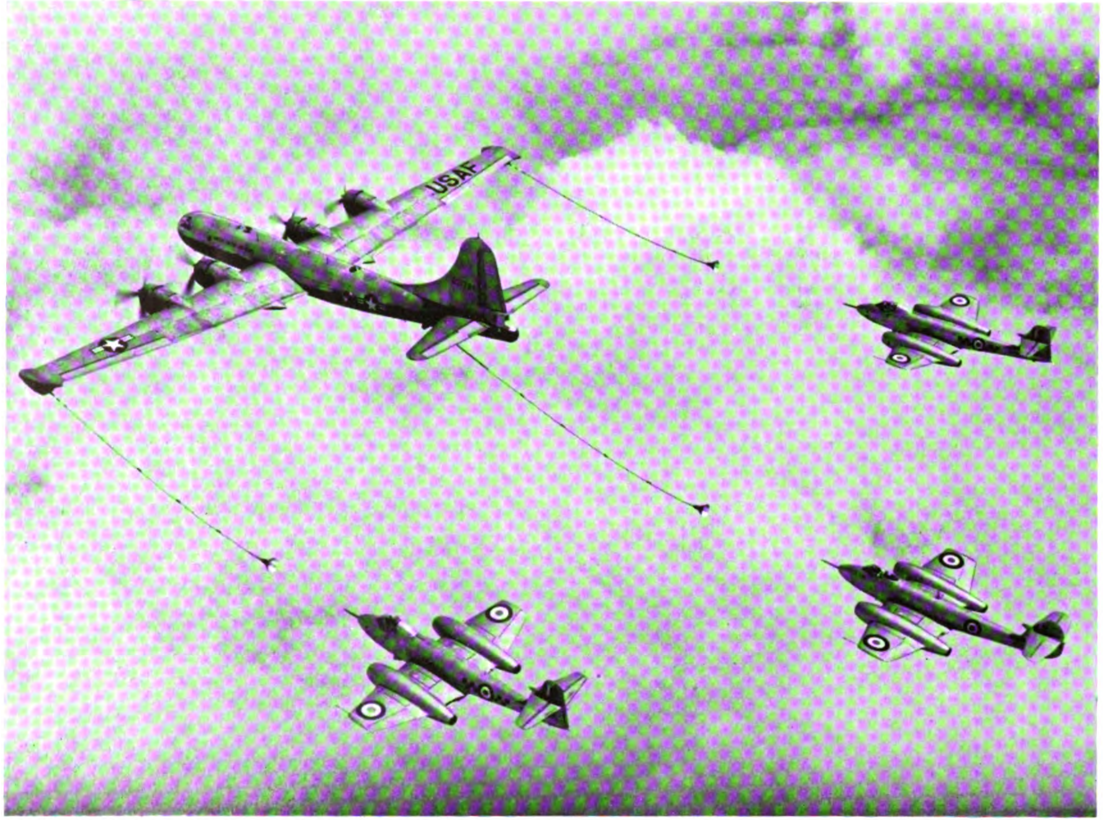
Imperial Airways planned to follow up with a flight refuelled passenger service in 1940, but the war put a stop to this, and there were no further developments until 1942, when a small team from Flight Refuelling Ltd. visited America, where British equipment was fitted to a B-24 Liberator tanker and B-17 Fortress receiver, for tests at Eglin Field.

Despite the success of these tests and of the pre-war commercial service, flight refuelling was not used in the Second World War. It is difficult to appreciate why, for the whole purpose of the grim island-hopping campaign in the Pacific was to bring Allied forces—particularly bombing forces—near enough for the assault on Japan. Even then, the Superfortresses had barely enough fuel to operate from the Marianas bases of Saipan, Guam and Tinian. Flight refuelling would have enabled them to operate safely from more distant bases, and would certainly have saved many of the bombers which ran out of fuel and fell into the sea on the return flight.

Similarly, flight refuelling could have been of immense value to R.A.F. Bomber Command. The ranges over which it operated were smaller than those in the Pacific theatre; but as bomb-loads increased—particularly when 22,000 lb. bombs were available—some targets became beyond the range of our Lancasters. Volume II of *Royal Air Force 1939-1945* gives the range of a Lancaster I as 2,350 miles with 5,500 lb. of bombs or 650 miles with 13,000 lb. of bombs. Flight refuelling could have increased greatly our striking power and, in fact, 500 tanker and 500 receiver sets of equipment were ordered in 1944 to give our Lancasters and Lincolns sufficient range to attack Japan from Chinese bases, after the inevitable defeat of Germany. But the war ended before the equipment could be manufactured and installed and, since then, except for experimental installations, the Royal Air Force has not made use of flight refuelling.

ADOPTED BY THE U.S.A.F.

The U.S.A.F., on the other hand, decided in 1948 to adopt flight refuelling in a big way, after post-war experiments by British South American Airways, B.O.A.C. and Flight Refuelling Ltd. had proved that radio and radar aids made possible refuelling contacts over the Atlantic even at night or in comparatively bad weather. It was easy to understand the U.S.A.F.'s keenness, for relations with Russia had become so strained by 1948 that a Third World War was more than a mere possibility. Yet, even with bases in Britain, B-29 Superfortresses with atomic bombs could not have reached many of the most important Russian targets, for the 3,000 mile round trips which had carried atomic bombs to Hiroshima and Nagasaki in 1945 represented the limit of the Superfortresses' range.



Three Meteors being flight refuelled at once by a Superfortress tanker equipped with "Flight Refuelling Ltd." probe and drogue equipment.

Refuelling once in flight increases a bomber's range by some 33 per cent., and a second refuelling on the return journey more than doubles its effective striking radius. So, by use of flight refuelling, targets as far away as the Ural Mountains could be brought within range of atomic bomb carrying Superfortresses.

Before long, the first B-29's equipped for looped-hose refuelling were standing by at bases in the United Kingdom, and in 1949 America demonstrated the power of her new "global strategic air force" with the round-the-world non-stop flight by *Lucky Lady II.*

By then, however, the jet engine, with its high fuel consumption, was beginning to present air force commanders with a host of new problems. By the time they had climbed to their operating height, jet fighters had sufficient fuel for only a few minutes' combat before they had to land for refuelling. Accidents due to running out of fuel began to increase. Prolonged night interception missions by jet fighters seemed out of the question. Nor were the problems likely to be less in the case of multi-engined jet bombers, then under development. Yet flight refuelling appeared to be impractical, as the single-seat fighters had no second crew member to handle the hose, and the looped-hose technique was hardly suitable for 600 m.p.h. pressurized bombers flying at 40,000 ft. or more.

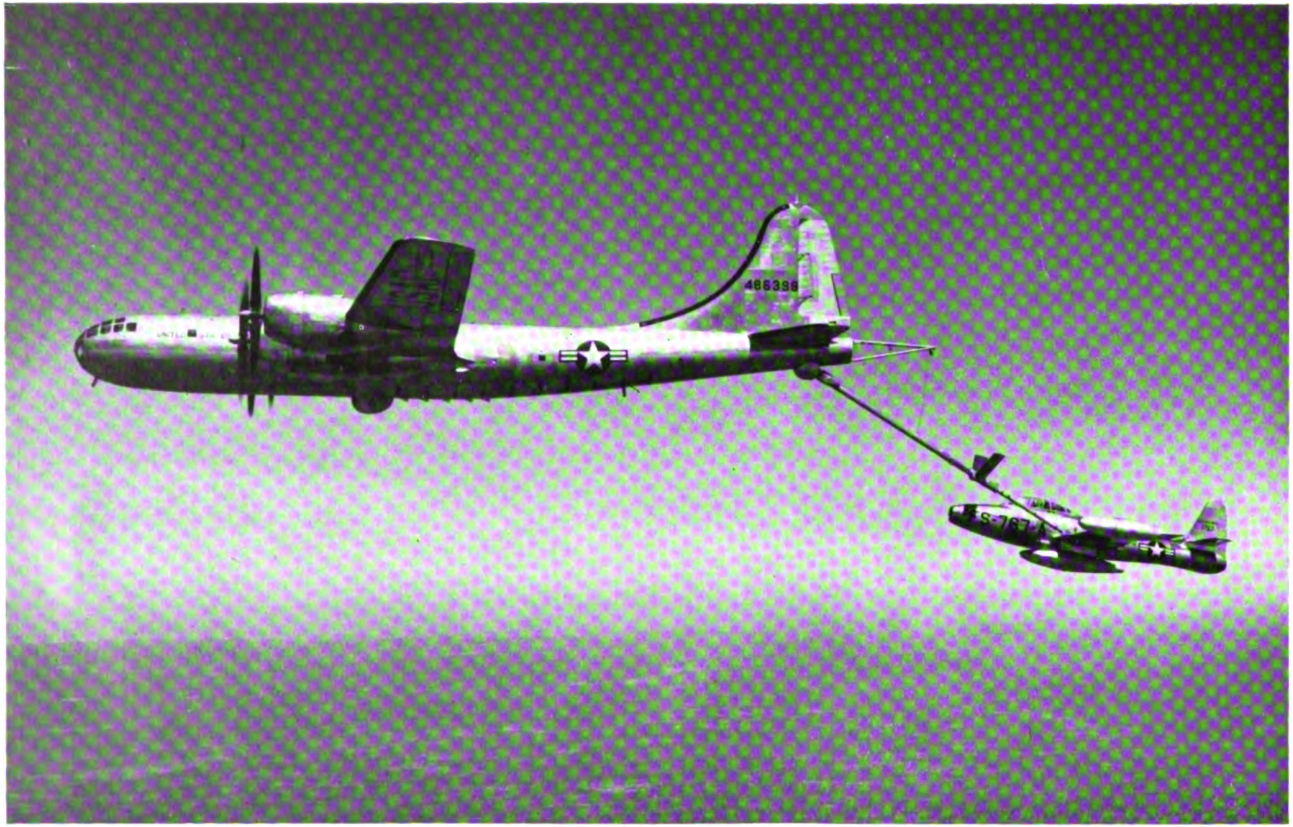
The U.S.A.F. asked Flight Refuelling Ltd. for an answer, and within four months the first tests were being made with the now-famous "probe and drogue" system. Instead of a looped hose, the tanker trails a 100 ft. straight hose with a conical drogue at the end. This drogue serves the dual purpose of keeping the end of the hose steady in flight and of providing a guide for the refuelling probe fitted to the receiving aircraft. Incredibly simple to operate, all the receiving pilot had to do is approach the drogue at a speed some 5 m.p.h. faster than the tanker and ram his probe into it. Fuel automatically starts to flow at a rate of up to 500 gallons a minute as soon as contact is made, and ends when the probe is withdrawn.

The U.S.A.F. were quick to demonstrate the effectiveness of the probe and drogue system with another dramatic flight—this time the first non-stop trans-Atlantic crossing by a jet fighter. Two F-84 Thunderjets made the attempt, refuelling contacts being arranged over Prestwick, Iceland and between Greenland and Labrador. One failed to take fuel from the third tanker and its pilot bailed out over Labrador. The other landed safely at Limestone, Maine.

Since then the equipment has been steadily improved, and compact hose-drum units are now available which weigh only 1,100 lb. and can be fitted quickly and easily as a "package" into the bomb-bay of aircraft as small as the Canberra. In fact, three can be carried by an aircraft like the Superfortress — one in the fuselage and one at each wing-tip—for refuelling three fighters at once, and conversion from bomber to tanker can be carried out in the field in half an hour. Weight of the probe equipment on the receiving aircraft need be little more than 12 lb. and can be a permanent fixture.

Probe and drogue refuelling has been adopted on a steadily growing scale by both the U.S.A.F. and U.S. Navy, and a company named Flight Refuelling Inc. has been formed to deal with business and manufacture in America. But it is not used exclusively, and the KC-97 which "rescued" the B-47 over Oxford in April used Boeing flying boom equipment.

This too is a "packaged" unit, so far as the tanker is concerned, the basic difference being that a rigid tubular metal "hose" is used instead of a flexible hose. It is controlled by a boom operator aboard the tanker, who has to "fly" the boom by means of small "ruddevators" to connect up with a socket on the



Republic's F-84G Thunderjet, first U.S.A.F. fighter to refuel in mid-air and carry the atomic bomb, is shown taking on a load of fuel in flight from a Boeing KB-29 Tanker.

receiving aircraft. It is by no means as difficult as it sounds and, once connected, the telescopic construction of the boom takes care of slight changes in the relative position of the two aircraft.

The U.S. Navy uses only the probe and drogue system, but the flying boom method is widely used by the U.S.A.F., who assign twenty KC-97's to each forty-five-plane wing of B-47's. The quickly removable "pod" carrying the boom, operator and controls was interchangeable with the freight doors on early KC-97's, so that they could be switched quickly from freighter to tanker role and vice versa. But the pods are attached permanently to the latest KC-97G's, which can be used for either role without modification except for removal of fuel tanks and pumps.

All B-47's and all F-84G Thunderjet fighters are equipped as flying boom receivers. Thus, the U.S.A.F. were able to ferry 133 Thunderjets of the 31st and 27th Fighter-Escort Wings of their Strategic Air Command quickly across the Pacific to Korea in 1952, escorted and refuelled *en route* by KB-29 flying boom tankers. And, last year, KC-97 tankers played a big part in similar mass flights of Thunderjets and the 305th and 306th Medium Bomb Wings of B-47's across the Atlantic to Britain.

Some idea of the mobility which the bomber-tanker team makes possible is given by the fact that entire B-47 wings are making 4,800-mile hops from their permanent bases in America to airfields in Morocco in ten hours. Within twenty-four hours of arrival they fly a 4,000-mile simulated combat mission deep into Europe, and keep up the exercise for thirty days or more, with all their wants supplied by their train of tankers and transports.

At the moment, there is little to judge between the probe and drogue and flying boom systems. But the fact that the hose and drogue are fully retractable, whereas the boom is not; that the flexible hose must be somewhat safer in bad weather or gusty conditions; and that three aircraft can be refuelled at once by a single operator with the drogue system, seems to give a long-term advantage to the British system. It may also be significant that the only high-speed tankers so far tested—American Boeing B-47 and British Canberra bombers—both use the fully retractable probe and drogue method.

So much for the methods of flight refuelling, and what has been achieved to date. What of the future? Does flight refuelling offer the sort of benefits that will give it an enduring place in air force planning, at least until availability of nuclear-propulsion eliminates range and endurance problems?

Looking first at bombers, an over-all economy equivalent to a saving of one aircraft in every two can be effected by flight refuelling. Let us assume that we want to deliver 300 tons of bombs over an operational radius of 2,100 miles. Using normal methods, this might involve dispatching sixty aircraft, each carrying five tons of bombs and flying a total distance of 252,000 miles.

Now, if we use flight refuelling, each bomber can carry, say, fifteen tons of bombs, because bombs take the place of fuel at take-off. So we need dispatch only twenty bombers, accompanied by ten tankers which refuel the bombers halfway to the target and then return home. The same weight of bombs as before will be carried to the target, using only half as many aircraft (only one-third as many over the target), and total mileage flown is only 105,000.

Much the same economies can be obtained with a fighter force, which can be kept in the air for long periods, instead of having to land repeatedly for refuelling. Less time on the ground reduces vulnerability to enemy attack and, especially in the case of carrier-based aircraft, "stacking" while other aircraft

[Photo: Boeing Airplane Company

Modified Boeing KB-47B Stratojet Tanker (right), refuelling another B-47 Stratojet medium bomber.

land, diversion in bad weather and similar emergencies need not result in crash-landings or bail-outs through fuel shortage.

There are many other possible benefits. Smaller, faster aircraft can be given the range to fly to distant targets, and higher wing loadings are possible because aircraft do not have to take off with a heavy fuel load.

The fact that Boeing have spent $15 million of their own money on their new Jet Stratoliner-Jet Stratotanker dual-purpose transport leaves little doubt that they foresee a continuing demand for flight refuelling by the U.S.A.F. Obviously, future refuelling will have to take place at the great operating heights of modern warplanes, so high-speed, high-flying aircraft with fully retractable refuelling equipment will be essential.

Nor should we overlook reports that a Vickers Valiant bomber has been seen over Southern England refuelling from the experimental Canberra tanker. Use of this technique could help to make a small force of "V" bombers, armed with nuclear bombs, into a weapon of such terrifying long-range striking power that no nation would again contemplate embarking on the mass suicide of total war.

FLYING-BOATS AND MARITIME OPERATIONS

By J. R. Vezey, A.M.I.E.E.

THE future role of the flying-boat—how I wish I knew the answer to this one. Unfortunately this is a question that has got completely befogged by the extreme arguments of those for and against, and any paper on the subject not apparently biased one way or the other gives the appearance of sitting on the fence. The future role of the flying-boat depends, therefore, more on chance than any scientific appraisal of the facts; it depends on comparisons of a flying-boat nearly twenty years old with modern land-planes; it depends not on long-term planning but on the particular state of the country's finances when the problem of the flying-boat comes up; it depends on the priority or lack of priority that is given to the defence of the sea lanes of the British Commonwealth; it depends on prejudice.

Let us see if we can dispose of some of the extreme arguments and try and make a decision on what is left. I intend to confine my remarks entirely to maritime air operations, partly because I know more about them and partly because the cost aspects of civil flying are so biased by Government subsidies, present landing facilities and the like that an abstract study of the relative costs of civil land-planes and flying-boats has little meaning. I will also assume at the risk of being considered old-fashioned, that it is the intention to retain a Royal Navy and maritime Air Force as defenders of our maritime commitments.

To discuss the suitability of any type of aircraft for maritime air operations we must bear in mind what we want to do. For this purpose we will divide these operations, in rough order of priority, into the following:

(*a*) Protection of our shipping against attack, mainly from submarines.
(*b*) Attacks on enemy shipping or enemy naval vessels.
(*c*) Special duties such as the protection of lives and property in various parts of the world, relief work following earthquakes and the like, military evacuations and transport duties generally.
(*d*) Air-sea rescue work.

The first two of these are only of importance in war, and of these the protection of our shipping is by far and away the most important to the British Commonwealth. In any major war in which the Continent of Europe is involved, the main struggle would almost inevitably be in the North Atlantic, as this is where the shipping is most heavily concentrated. Attacks on our shipping in other oceans would only be made by an enemy as a diversion or if he was forced into action by defeat in the major theatre.

Let us therefore consider the relative merit of flying-boats and land-planes in the light of the above tasks from the following aspects:

(*a*) Economic advantages and disadvantages.
(*b*) Strategic advantages and disadvantages.
(*c*) Tactical suitability to the tasks.

ECONOMIC CONSIDERATIONS

The main argument usually levelled against flying-boats is that it is an "extra" type. The more types of aircraft that one has, the higher are one's overheads and the less interchangeable are one's men and aircraft from squadron to squadron or from station to station. Each extra type means extra training for ground crews and air crews, extra sets of spares, extra administrative work.

Now in planning a maritime air force there is a certain minimum number of aircraft, within limits independent of the threat and easily calculable, that one must have in order to give oneself a chance of winning the battle. This number is such that we cannot afford to make them all of long-range types capable of operating in the middle of the Atlantic, or any other ocean for that matter. To get the best measure of defence for a given sum of money we certainly need two and probably three different types of aircraft for anti-submarine operations and further types for anti-shipping purposes. This is even more important in war when manufacturing effort rather than money is the limiting factor. Each of these types would be in sufficient numbers, in war at any rate, for the training and other administrative arrangements to be economic in themselves. Thus the argument against the flying-boat as being an "extra" type is probably an exaggerated one, if it can fulfil one of the necessary roles without other disadvantages.

Most of the other economic arguments can be dismissed as of minor account. A flying-boat is only slightly, if at all, more expensive to build than a land-plane, provided that they are both made in comparable numbers and comparably equipped factories. The over-all accident rates are of a similar order, the take-off and landing accidents being less for flying-boats but the taxying accidents being greater. The maintenance cost in men and materials per flying hour has in the past been rather greater, 10 to 20 per cent., for flying-boats.

There is, however, one economic factor greatly in favour of the flying-boat. The capital cost of a new flying-boat base is much smaller than the capital cost of a new land-plane base, estimates varying from about a quarter to one-half of the latter. From the point of view of an Atlantic war this difference is not important as the necessary land and flying-boat bases are in the main already available. It may, however, be important in the case of diversionary campaigns farther afield.

STRATEGIC CONSIDERATIONS

Any strategic distinction between boats and land-planes must, of course, be based on the existence of something that boats can do and land-planes cannot, and which is, or is likely to be, necessary to a maritime air campaign. The outstanding feature that a boat can do, and a land-plane cannot, is to land on a stretch of water without the necessity of having a specially prepared runway. This has two advantages:

(*a*) It enables flying-boats to operate from localities where airfields cannot be laid or are difficult to lay because of the nature of the terrain.

(*b*) It enables flying-boats to operate from an indefinite number of locations in a large area as the tactical situation demands without the necessity of having runways previously prepared.

Now there are very few coastlines and islands in the world where it can be said that it would be impossible to lay down a runway for land-planes, particularly in areas where a maritime war is at all probable. One cannot therefore say that a flying-boat is a strategic necessity, though undoubtedly there are areas where operations on an extensive scale would be easier with flying-boats. There are countries like Norway where it is difficult to find locations for runways suitable for long-range aircraft, and again places like Gibraltar and Hong Kong where the facilities for land-planes are strictly limited and may be fully utilized by other aircraft.

We will now turn to the second possible advantage of the flying-boat, which in effect is its mobility. This can be considered from three aspects, the first being the system of operating from a main base with several advanced bases, the second the speed with which a flying-boat is able to begin operation from a previously unprepared base, and thirdly the special duties that can be undertaken.

Taking the first of these, the main base will have all the necessary facilities for maintenance of flying-boats, whilst the advanced base requires only facilities for fuel and minor repairs. The purpose of this system is to extend the area of operations covered by a squadron beyond that normally accessible from the main base. Such systems of operations were adopted in the Second World War in the Indian Ocean and in West Africa, and in general will only be of value in a secondary rather than a major campaign. Similar areas when the system could be of value are the South-West Pacific and the East Indies.

The second advantage of mobility is the speed with which the flying-boat is able to begin operations from a previously unprepared base. This property of high mobility is most marked when a flying-boat depot ship is used. It is, however, an expensive method and should only be used when mobility is of very great importance.

The third advantage is the flexibility with which a flying-boat can be used on special duties both in war and peace. Examples of the former were assistance in the evacuations from Greece and Crete and clandestine duties in various areas. In peace, Sunderlands were used to evacuate sick from inland Burma by being able to land on the River Salween; they were used with marked success in the Berlin airlift, and more recently in the provisioning of the Greenland expedition.

Thus, though one cannot argue "absolute necessity" for flying-boats on strategic grounds, they have an advantage on grounds of mobility in theatres of operation away from the main threat. It is also on the grounds of mobility that flying-boats are so useful, both in peace and war, for the various special duties. A further advantage is the comparative immunity of flying-boat bases from air attack, in that the runways cannot be put out of action by bombing.

TACTICAL SUITABILITY TO THE TASKS

The main object of our maritime forces, both naval and air, is to protect our shipping from attacks, and provided the individual ships and convoys arrive safely in port, the object is achieved. However, in order to do this it has always in the past been found necessary to discourage commerce raiders, whether surface vessels or submarines, by either sinking or capturing a proportion of them. No satisfactory means has yet been found of effectively nullifying the effects of gunfire or torpedoes without actually sinking the weapon-carrier. This can be done either at their bases or at sea, and I think it likely that for a considerable time to come some proportion of the necessary kills will have to take place at sea.

The primary threat against our shipping in the open oceans has, in the past two world wars, been the submarine, which is a unique weapon-carrier in that it can change its method of operation, either on the surface or submerged, at will. It is this particular feature of the submarine that necessitates that the anti-submarine forces should consist of a combination of ships and aircraft working closely together. Neither can win the battle economically without the other. As the technical struggle progresses, sometimes ships and sometimes aircraft are the more effective killers of submarines, but always the combination of the two should be able to defeat the submarine. We then have to ask the question: is there anything the flying-boat can or cannot do, or the land-plane can or cannot do, in the tactical sphere of anti-submarine operations?

For most of the Second World War there was probably nothing to choose between the two types on this score. There was little difference in the percentage of occasions in which they could not operate due to bad weather. The flying-boat did, however, have a higher percentage of kills per sighting of surfaced submarines than land-planes, but this was probably not specifically due to their being flying-boats but due to their happening to have better look-out positions. Towards the end of the war, and after the introduction of snorts in U-boats, the flying-boats did suffer relatively in the tactical sphere due to the inability of the particular types in use to carry the newer types of weapons being introduced.

The anti-submarine aircraft of the present day carries a multitude of gadgets, which are more likely to increase rather than decrease in the future. The object is the desirability, if possible, of searching for and killing submarines either on the surface or submerged. We know land-planes can be built to carry these gadgets, though space is undoubtedly getting cramped. The question is, can the flying-boat also be built to do so? Undoubtedly it is more difficult, as large bomb-doors cannot be built into the hulls of flying-boats. If this design difficulty can be overcome, and I am assured it can, then the large hull space of the flying-boat will provide more comfort and room for the crew to operate their gadgets. If this design difficulty cannot be got over, there is no doubt that land-planes will make better maritime aircraft.

On the basis of a war against snort-fitted submarines, such as was waged in 1944 to 1945, there is thus not much to choose between flying-boats and land-planes as such, the difference between individual aircraft being merely a measure of the designer's ability. However, although the snort-fitted submersible can be considered technically defeated, we must look ahead to the next breed. Undoubtedly this will tend to remain submerged longer than present types, though the fact that this will be so can be considered an initial defeat for the submarines from the start. We thus are likely to have to search for, or at least locate, more submarines under water than we did in the past if we wish to retain our rate of sinkings. To search for an under-water submarine it is much easier to sit on the water than to fly above it. A land-plane cannot sit on the water but a flying-boat can. Here, then, is a possible tactical advantage to the flying-boat in a war of the future, especially as flying-boats can now be built to operate on the surface in much rougher water than they could in the past. This feature is again likely to be of more advantage in areas of lower priority where less surface vessels are likely to be available for air-sea co-operation.

The anti-shipping aircraft, at any rate for all except against the largest type of enemy ship, should be small, fast aircraft—small because great weight of weapons is not required, fast because of fighters and flak. This means that a separate type from the anti-submarine aircraft is required, and it is improbable that anyone would develop a flying-boat especially for this purpose. Against bigger ships heavy weapons are probably required, and it seems likely that storage problems and ease of dropping would be against the flying-boat.

For air-sea rescue work the flying-boat has obvious advantages and I won't dwell on them. The large hull of the flying-boat also has considerable advantages in the various special duties mentioned earlier.

CONCLUSIONS

To sum up, the flying-boat seems to have no obvious disadvantages in a maritime air campaign except possibly design trouble with regard to carrying and dropping heavy weapons. There is no "absolute strategic necessity" for it but it has mobility reasons to commend it in areas of minor threats. It may also have tactical advantages in a future anti-submarine role. There are also undoubtedly occasions, both in peace and war, when the special duties required could not be undertaken without flying-boats.

Part of my job as an operational research worker is to estimate chances. If, therefore, the question of the flying-boat versus the land-plane is viewed on its merits, then I would estimate the chance of a flying-boat having a future role as 2 to 1 on. If the question is based on prejudice, as I fear it may be, I estimate the chances as 2 to 1 against. I regret this latter conclusion and I hope I am wrong. Other countries are still building flying-boats, and it will be most regrettable if we should lose the lead we have held in the past in the design and operation of this particular type of aircraft.

The author wishes to acknowledge the information kindly placed at his disposal by Mr. H. D. Poole (now with the R.C.A.F.) from a Research Branch Report drawn up by him, which greatly assisted in the writing of this article.

TO PRESIDENTS OF SPORTS ASSOCIATIONS

Brief accounts of activities in the various branches of sport in the Royal Air Force with good "action" pictures, not only provide interest for our readers, but also stimulate general interest and support in those sports throughout the Service.

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The Editor of "Air Power,"
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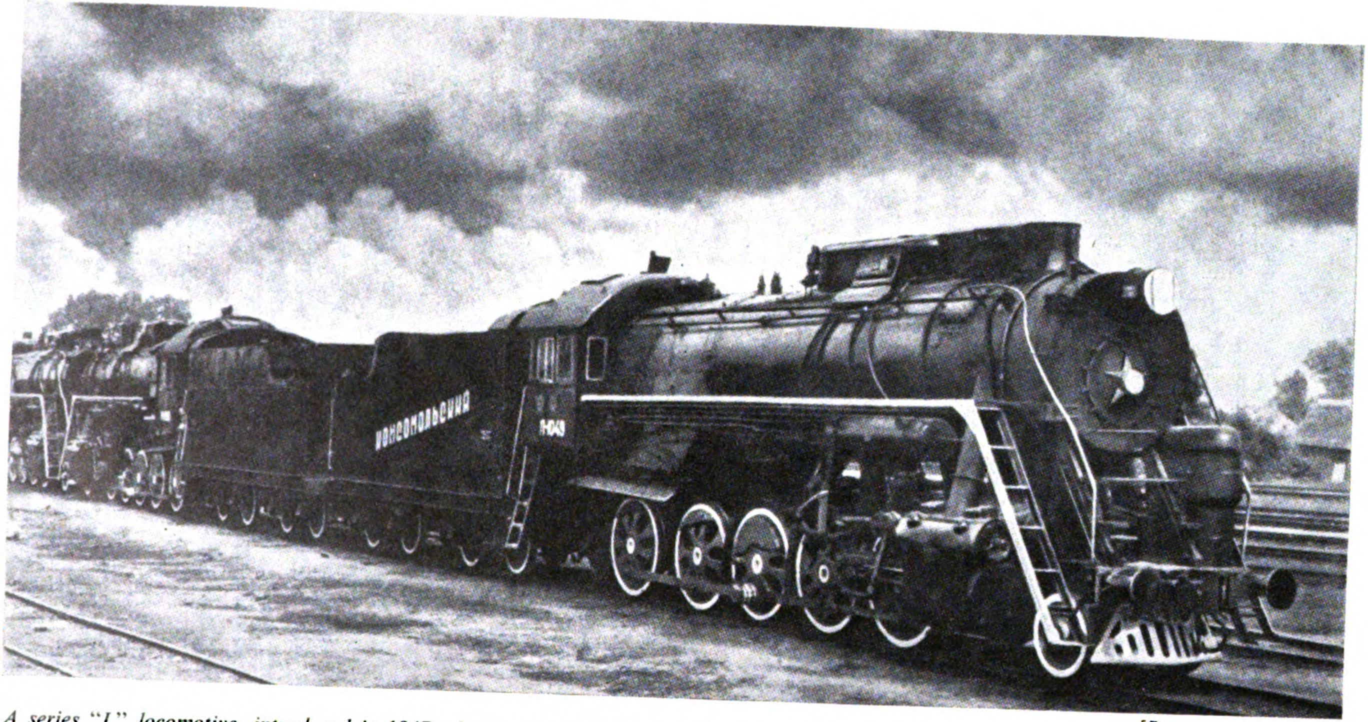
Eastbourne.

They should not exceed 600 words and for inclusion in the next number must reach the Editor by 1st August, 1954.



[By courtesy of "Ogonëk"

A series "L" locomotive, introduced in 1947, these powerful 2-10-0 engines were designed to cope with the increasing weights of post-war goods trains.

RUSSIA'S RAILWAYS

BY SQUADRON LEADER J. F. L. LONG, M.A., R.A.F.[1]

IT is, unfortunately, only too easy in discussing the railway system of Soviet Russia to forget that it is quite unlike the railway systems of the industrialized nations of the West. This is a point which Russian leaders themselves make much of for political and ideological reasons and, although we should be ill advised to take heed of their reasons, it is still worth our while to remember that our standards are not theirs. Stories of how really hard "hard-class" travel is in the U.S.S.R., or how appalling the plumbing is on even the crack expresses, are excellent examples of judging by the wrong standards. The Russian leaders, as L. M. Kaganovich, Malenkov's railway expert, made plain last April, are not interested in smart, fast passenger trains; their interest in their railways is a down-to-earth one. In peace the system must keep the wheels of industry turning. In war it must not only continue to do this—under conditions far worse than those prevailing in the last war—but must also stand the strain of serving as the main supply line of the Soviet armed forces.

It is no exaggeration to say that the railways are the most important single element in the whole Soviet transportation system. Soviet industry, as the map opposite page 400 plainly shows, is almost completely dependent on them. Till recently, about 90 per cent. of all domestic goods traffic (measured in metric ton-kilometres) was carried by the railways. Now, according to Kaganovich, 84.5 per cent. of the domestic goods traffic goes by rail, 11.4 per cent. by river and sea and the remainder by road or air. Upon completion of the fourth Five-Year Plan in 1950, the railways could boast of having surpassed their target figure of 771 million metric tons of goods carried. By the end of the present Plan next year, the total weight of goods moved by rail may well top the 1,000 million ton mark, or twice the 1947 figure.[2] Although the proportion of river-borne freight will undoubtedly rise sharply as a result of the navigational improvements now being made to Russia's inland waterways, and much greater tonnages will be moved by pipeline, sea, road and air, the predominant position of the railways as goods' transporters will not be affected materially.

The reasons for this predominance are not always properly appreciated, and often misunderstood. The network is, in shape, little more than an improved version of the rail system of the Tsars. The centre of the system is still Moscow, from which lines radiate to the chief towns and industrial areas of Western Russia. The capacity of these radial lines has been strengthened and the links between them improved, but no revolutionary alterations have taken place. Likewise eastwards one notices chiefly an improvement of facilities that existed previously. To the south-east, there is the incomplete system of the

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[1] The author wishes to acknowledge a considerable debt to Professor Holland Hunter's research on Soviet railways, particularly pages 16, 17 and 20 of his "Soviet Railways since 1940" which appeared in *Bulletins on Soviet Economic Development*, No. 4, published by the University of Birmingham. Acknowledgment is also made of Harry Schwartz's *Russia's Soviet Economy* (pages 330-358), Theodore Shabad's *Geography of the U.S.S.R.*, pages 82-92, Jane's *World Railways*, and Paul Wohl's article entitled "Transport in the Development of Soviet Policy," which appeared in *Foreign Affairs: An American Quarterly Review* in April, 1946. Individual Russian sources are too numerous to mention, but these include material down to 31st May, 1954.

[2] The volume of traffic per kilometre is two and a half times that of the U.S.A. and four times that of the United Kingdom.

Caucasus; to the north-east, the relatively new Vorkuta-Salekhard line down which coal, oil and timber flow from Russia's Far North. Due east the system remains to this day exiguous in the extreme; indeed, from Krasnoyarsk on the river Yenisey to Chita in Trans-Baykalia (a distance of nearly 1,600 kilometres), the railway line is the only transport artery of any consequence. Part of this line forms the base of the still meagre railway triangle of the Central Asian republics. In all there are 106,400 kilometres of track, compared to 358,400 kilometres in the U.S.A., or 84,800 kilometres in this country, though it must be remembered that, in size, the U.S.S.R. is three times the size of the U.S.A. and eighty-six times the size of the United Kingdom.

To say this, is not in any way intended to disparage the efforts of Russia's railway builders in the years after 1917. They have sought, notably since 1928, to keep pace with the vast programmes of industrialization and collectivization. Their method has been the comparatively conservative one of concentrating upon essentials. At first the railways were expected to bear the great increases in goods traffic with little expansion of facilities. Thus between 1928 and 1932, although goods traffic increased by 80 per cent., the length of new line in operation increased by only 6 per cent. During this period, however, the important Turk-Sib line was built to link the deep south with the newly created complex of Kuzbas industries. The demand for transportation, nevertheless, was already out-stripping the traffic capacity of the railway and by the close of 1932 the amount of goods awaiting carriage had jumped to the alarming figure of some 20 million tons. This desperate situation called for immediate measures if the industrialization and collectivization programmes were to go forward. To Kaganovich fell the task of finding a solution. He ordered the improvement of selected trunk lines and rolling stock, without regard to the condition of the remaining lines and stock. He undoubtedly saved the Five-Year Plan from disaster, but created thereby a further problem which only now appears to have been surmounted. By making the trunk lines the backbone of the whole communications system, he widened the gap that had previously existed between the best and the worst lines. By 1940, for instance, 40 per cent. of the total track mileage was dealing with more than 75 per cent. of the total traffic.

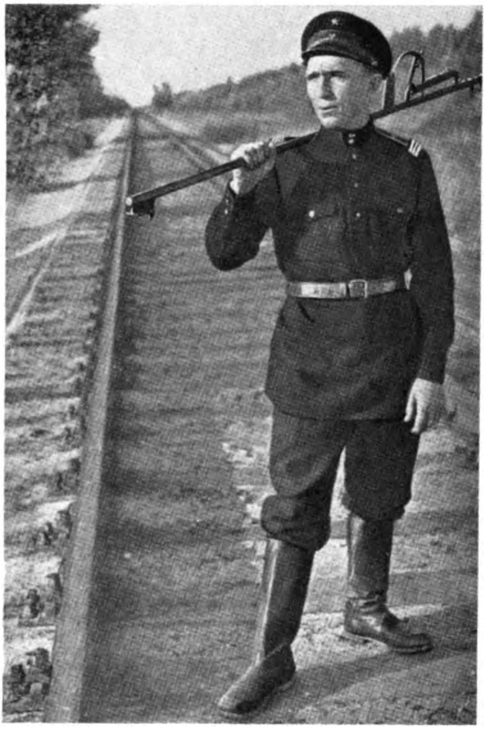
Yet a further plan for enabling the railways to cope with the freight problem was launched in 1939 and is still in operation today. By encouraging regional self-sufficiency in industry and by taking measures to prevent irrational cross-hauls and reduce long-hauls, it was possible to free the railways of many unnecessary loads. At the same time railway building, which had ceased completely in 1937, began again.

The war brought devastation to much of the system. More than 40 per cent. fell to the enemy and most of this was destroyed; 80 per cent. of the engines however, and 85 per cent. of the freight cars were evacuated. During the war itself, 11,000 kilometres of new line were built (*a*) to support the army; (*b*) to improve connections between regions; and (*c*) to permit the exploitation of resources in virgin areas. Restoration of lines and facilities destroyed by the enemy went forward at a remarkable rate and, by the end of the war, nearly 50,000 kilometres of the 70,000 kilometres destroyed had been rehabilitated.

The railway system did not break down under the additional strain of war, as the German High Command had confidently expected, and proved itself capable, as it had not done in the war of 1904-1905 against Japan, of sustaining both the economy of the country and the armies at the front. Lease-lend supplies undoubtedly assisted in this, but not, it must be remembered, in the initial period when the Germans sought to gain a decisive victory. Is there a lesson to be drawn from this? If so, to what extent is it affected by post-war railway developments in Russia?

The chief lesson, it seems, is that in making plans and dispositions for an indefinite prolongation of the cold war, we should not assume that a breakdown will occur on Russia's railways, bringing with it industrial chaos and internal unrest that might diminish Soviet power as a factor in world affairs. It would certainly be unwise to assume that, because the ambitious construction developments outlined under the 1946-1950 Plan for the railways were not achieved, the rate of industrial development will be slowed down, or even halted. Productivity of labour within industry, not the failure of the railways to reach their targets, may well prove the most serious limiting factor in the period to 1960 at least. Beyond 1960 it is not possible to speak with any degree of certainty. Investment in the railways remains heavy and the spurt made since late 1949 to make good some of the optimistic promises of 1946 has been impressive. The South Siberian line is open as far as Stalinsk and, by April this year, 140 kilometres of track on the difficult section from Stalinsk to Abakan had been laid. This will go a long way towards shifting some of the load from the overworked Trans-Siberian. There is, as yet, no mention of completing the Abakan-Tayshet portion of the South Siberian (the most difficult of all), nor any news of the important North Siberian route via Bratsk and Tynda to Komsomolsk, a pre-war project. With the completion of the Mointy-Chu section of the Kazakhstan trunk line in January this year, the coal centre of Karaganda has been linked at last by a direct route (thirty-six hours instead of five days) to the light industries of Tashkent and Alma-Ata. Farther west the line that eventually will run practically straight to Saratov and Moscow, has been completed as far as Kungrad on the Aral sea, thus facilitating the movement of cotton southwards for processing. Work on the important Argyz-Pronimo-Surgut route, linking four east-west lines and strengthening communications between the industrial region of the Urals and the south, is going forward fast. At the same time, with the prospect of cheap electricity from a large number of conveniently sited hydro-electric stations, including the recently announced station at Novosibirsk, electrification of the Trans-Siberian route from Chelyabinsk to Stalinsk (1,500 kilometres) is going forward, as well as lines in the Caucasus (based on the electricity from the Mingechaur Hydro-Electric Scheme), in the Ukraine, in the Moscow-Volga region and in the Urals. With the introduction of high-capacity wagons and the development of steam, diesel and electric locomotives of improved operational efficiency, still heavier trains of up to 3,500-4,000 tons (instead of 1,800 as at present) may become possible.

Preparations, it would thus appear, are being made to ensure that the railways of Russia are fully able to cope with the increasing volume of traffic that will be thrust on them in the next seven years. And yet, despite all the energy displayed, one cannot help being struck by strange anomalies that still persist in a country whose terrain can only be described as a railway engineer's dream. Kaganovich, in the speech alluded to above, put his finger on most of these anomalies. Ministries, he said, still transport to enterprises "superfluous materials in excess of quantities needed for use or such as are not needed at all." The railways are "still being forced . . . to make excessively long and badly routed journeys . . . on which enormous sums are being spent." He instanced how the average haul of cotton since 1940 had risen 561 kilometres to 2,375 kilometres, timber by



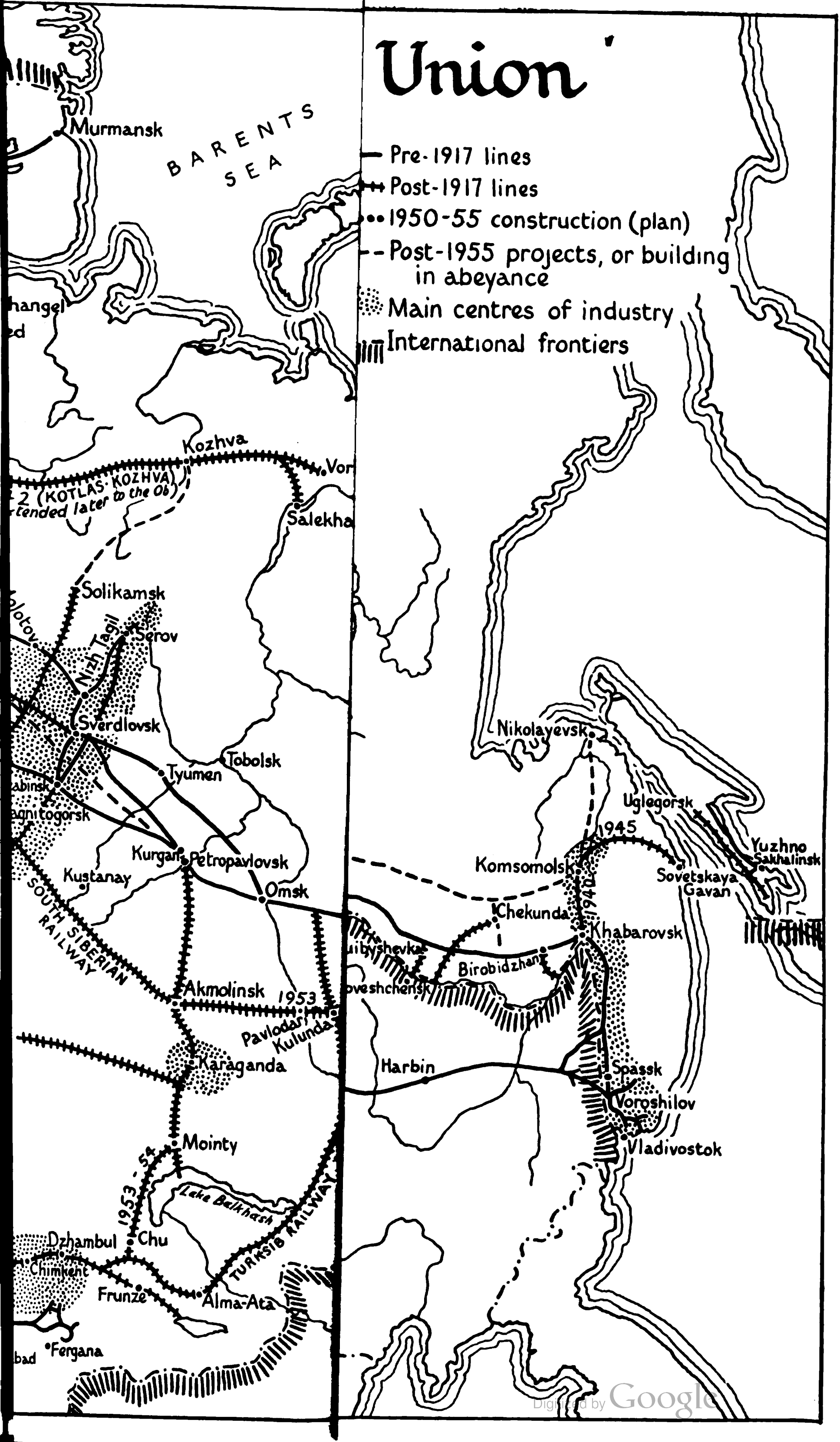
[*By courtesy of "Ogoněk"*

A ganger, dressed in the distinctive military-type uniform of a member of the Soviet railway's staff.

174 to 1,193 and iron and steel by 135 to 1,101 kilometres. Consumer goods also made much longer average journeys than they did fourteen years ago. Though some allowance had to be made for the developments that were going on in remote regions, a determined struggle had to be made to cut down the average haul which stood at 748 kilometres as against 722 in 1950. The reasons for this increase, Kaganovich said, could be attributed to "serious shortcomings in the planning of marketing, supplies and conveyance," to the uneven development of industry and to the lack of rhythm in production. Among a large number of instances of bad organization cited, a fairly typical one may, perhaps, be mentioned. The chassis and parts of self-tipping lorries are being transported 1,300 kilometres from Gorkiy to Odessa for assembly, after which the complete units are sent back to Moscow — and Gorkiy! More local initiative and imagination, Kaganovich suggested, would go a long way towards curing some of the headaches of the railway administration.

The most important index, however, of operating efficiency on the Soviet railways, the average turn-round time for freight cars—was only indirectly touched on by Kaganovich. Average turn-round time—that is, the time taken for each freight car trip—requires the maximum co-operation between all levels of railway staff as well as between railway staff and users. From recent indications it is evident that the position is not satisfactory. The 1940 average was 7.4 days. By 1945 this had risen to almost 11 days. The target figure for 1950 was just under 7 days, but this was not attained; nor, apparently, has it been attained even now. Kaganovich, referring to the "considerable reserves that exist for increasing the commercial speed of traffic," bluntly reminded Soviet users that at any given moment 11½ million tons of goods were travelling on the railways, on each ton of which the average delay was eight and a half hours *over* the limit laid down by the government.

Judged, then, by their own standards, and notwithstanding their many remarkable achievements during and since the war, the Soviet railways have failed to reach a really satisfactory level of operating efficiency. Much obviously remains to be done and it will be interesting to see, in coming months especially, what practical steps are taken to encourage railway staff and users alike to mend their ways. Kaganovich has already offered his expert advice. Will the railway authorities take the hint? Or will they (to use Kaganovich's own words) continue to "whinney now and then against uneconomic transportation of goods, instead of neighing so loudly as to be heard properly"?


Union
Pre-1917 lines
Post-1917 lines
1950-55 construction (plan)
Post-1955 projects, or building in abeyance
Main centres of industry
International frontiers
Murmansk
BARENTS SEA
hangel
ed
Kozhva
Vor
2 (KOTLAS-KOZHVA)
tended later to the Ob
Salekha
Solikamsk
olotov
Nizh Tagil
Serov
Sverdlovsk
Tyumen
Tobolsk
abinsk
agnitogorsk
Kurgan
Petropavlovsk
Kustanay
Omsk
SOUTH SIBERIAN RAILWAY
Akmolinsk
1953
Pavlodar
Kulunda
Karaganda
Mointy
1953-54
Lake Balkhash
TURKSIB RAILWAY
Dzhambul
Chu
Chimkent
Frunze
Alma-Ata
Fergana
bad
Nikolayevsk
Uglegorsk
1945
Yuzhno Sakhalinsk
Komsomolsk
Sovetskaya Gavan
1940
Chekunda
Khabarovsk
uibyshevka
Birobidzhan
oveshchensk
Harbin
Spassk
Voroshilov
Vladivostok

COLLECTIVE SECURITY

By Group Captain R. Fulljames., M.C., B.A., R.A.F. (retd.)

THE effective defence of this country must eventually depend largely upon the efficiency and power of the world authority that has been set up to prevent war. It is a tragedy that the United Nations Organization is hamstrung by the misuse of the veto and that its Security Council and Military Staff Committee are rendered ineffective. U.N.O. is at present as weak as its predecessor, the League of Nations, which failed to prevent the second devastating world war.

N.A.T.O. on the other hand is a great success, in spite of certain shortcomings; its co-ordinated strength has probably postponed and even prevented the threatened war with Russia. It seems probable that Russia will come to realize that she can no longer "divide and conquer" the free world and that her best policy is to discuss co-operation and world peace.

N.A.T.O. has created a liaison between the Service chiefs of several nations, which enables them to discuss freely the problems confronting them. This is a great gain, even though as a fighting force it still has a long way to go. Its creation and success is largely due to the initial drive of that far-seeing American soldier, General Eisenhower. It has been said in this connection that our Service chiefs have done more in the past five years to co-operate with our neighbours to prevent war than the politicians have been able to do in the past fifty years with their well-meaning but futile disarmament talks. One is tempted to wonder whether the failure to prevent the last world war was due to the weakness of political leadership, as it is commonly suggested, or to the absence of an effective collection security plan under the League of Nations.

Field-Marshal Lord Montgomery, speaking at Ottawa on 25th August, 1953, is reported in *The Times* to have said that if N.A.T.O. had come earlier he believed there would have been no Second World War, and in the strengthening of N.A.T.O. lay our best hopes of preventing a third world war.

No one can properly appreciate the modern requirements for preventing war who does not understand the overwhelming strength of air power. The strategic bomber, armed with atomic weapons, has rendered armies and navies comparatively innocuous. These bombers, which represent real air power, should remain largely in American and British hands within the N.A.T.O. structure. All nations within N.A.T.O. need to become air-minded and, appreciating the revolution in strategy that has taken place, should freely offer suitable airfields to the forces of N.A.T.O.

The terrible threat of the atomic bomber, still largely in American hands, has probably been the greatest deterrent to war. Russia is now known to be preparing for atomic warfare. It is indeed a gloomy picture—the world divided into two armed camps with the contestants holding pistols at each other's hearts. One of the pistols may be fired by a madman.

Marshal of the R.A.F. Lord Tedder has warned us that a war with atomic weapons may literally destroy European civilization. War would mean general suicide, and probably for that reason war will be avoided.

Is there a better way? Is there any prospect of building up the world authority and supporting it with a world security force to prevent aggression? Will Russia continue to be enemy No. 1? There is some encouragement in the thought that Russia has fought on our side in the two world wars. If she would turn again and help to build the crumbling structure of world authority, there would indeed be a prospect of peace and plenty.

Meanwhile let us trust in God and keep our powder dry. There is, however, a suggestion which might be considered. Russia has already agreed in principle with the rest of the Security Council to create an effective collective security system to support U.N.O. Can she be persuaded, when the U.N. Charter comes up for revision in 1955, to make a start in implementing that policy? It is suggested that if U.N.O. really means to make its power effective it should plan a long-time policy of creating an integrated international general staff, and with this in view should establish a U.N.O. school to train cadets for this new world force.

Such a school need not weaken either of the armed camps immediately, but it might do a great deal to establish a greater measure of mutual confidence. The mere acceptance of the idea of establishing a U.N.O. school would show the peoples of the world that they need not lose faith in the possibility of building a powerful world structure for peace.

The school would have the task of training suitable cadets for the work of co-ordinating and directing the U.N. forces of the future. The best type of recruit would be required, trained and disciplined from his youth to be loyal to the authority of the U.N. The morale and fighting spirit of such men, imbued with idealism and a high purpose, should be second to none.

This embryo force will menace none and will take many years to develop, but it will be the foundation of the world security force of the future. The force will eventually include inspectors to supervise armaments and disarmament in all countries.

There is no exact precedent for such an institution raised on a non-national basis, but many lessons can be learned from British and American cadet colleges. The creation of a world structure for security presents many problems, but they are not insuperable to men of good will, provided we can get some measure of Russian co-operation. Fighter Command during the last war showed what could be done by men of six or more nationalities working together in one squadron with loyalty and efficiency.

The success of N.A.T.O. surely points to the direction U.N.O. must go if it is to become effective. Is this primarily a military or a political problem? Perhaps it is political, but the idea will make little headway unless experienced Service men have examined it and declared it to be necessary and practicable. The Service with its knowledge of war has its responsibilities in planning for peace, and experience shows that we cannot leave the solution of these problems solely to the politician.

THE AIR FORCES IN PARLIAMENT

(This article was completed on 15th May, 1954.)

AIR FORCE interest in recent Parliamentary proceedings is principally concerned with the Statement on Defence, 1954 (Cmd. 9075, H.M.S.O., 1s.), with the debates on defence in both Houses, and with the debate on the Air Estimates in the House of Commons.

As the Military Correspondent of *The Times* has said, the Statement on Defence contains "an unusually imaginative panorama of a future global war, differing widely from the world wars of the past." It may be assumed that, if a third world war were to break out, atomic weapons would be used by both sides, since the great powers on either side have already provided themselves with these weapons, though it would appear that the western nations at present enjoy advantages both in quantity and quality. That being so, the first phase of the war, which would probably be sprung upon us with little or no warning, would consist of "intense atomic attacks lasting a relatively short time but inflicting great destruction and damage."

If, as seems most probable, no final decision were reached during the period of the first phase, this would be followed by a decline in the intensity of hostilities while both sides "would seek to recover their strength, carrying on the struggle in the meantime as best they might." This second phase is called in the white paper "a period of 'broken-backed' warfare." That is surely not a very appropriate name for it. There seems to be little justification for expecting the first phase to break our backs or the backs of our allies, or even those of our enemies. All the belligerents would doubtless be much disabled, but "broken-backed" seems far too strong a word. Since, however, the appellation has been officially adopted and applied, it must perhaps be accepted—under protest.

What may be expected to happen after the second phase, the Statement on Defence does not venture to prophesy. Would the second phase, in which the so-called conventional weapons and methods would perhaps again become relatively important, be decisive; or should we expect it to be followed by another short and intensive, but this time decisive, period of the new warfare, in which atomic or hydrogen or cobalt bombs would be the predominant weapons? We cannot tell. For this reason, it behoves us to be prepared to wage war by either or both methods; for if we are not, we shall certainly be defeated.

This brings us to the three aspects of our defence policy, which are also clearly stated in the white paper. We have:

(i) To resist the spread of Communism, to oppose Communist "adventures," such as those in Korea and Indo-China, and to fulfil our peacetime commitments overseas.

(ii) To prevent, if possible, the outbreak of a third world war by creating "the most effective possible deterrent against a major aggression."

(iii) To be prepared to win another global war if one is forced upon us.

The first of these obligations includes, of course, what is known as the "cold war," in which the Communist powers have manifest advantages. Besides the advantages of quick decision and of dictatorial control over their peoples, they can cause us to disperse, in remote and inconvenient places, our slender forces, which also have to provide the usual garrison troops in the colonies and additional forces to assist the civil power in maintaining internal security in such disturbed places as Kenya and British Guiana.

As parts of the deterrent to aggression must be counted our forces in Europe, in the Middle East and in the Far East, but the "primary deterrent," according to the white paper, "remains the atomic bomb and the ability of the highly organized and trained United States strategic air power to use it." But we are not leaving this entirely to our American allies. "We intend," continues the Statement on Defence, "as soon as possible to build up in the Royal Air Force a force of modern bombers capable of using the atomic weapon to the fullest extent," and this force of medium bombers is essential for our own security as well as for the defence of western Europe.

Preparations for a possible "hot war" on a world-wide scale must clearly be based on two principles: "Our active forces must be able to withstand the initial shock" and "our reserve forces must be capable of rapid mobilization behind the shield which our active forces provide." There will be no time, so sudden and overwhelming will be the initial attack (if it comes), to mobilize and train second-line and reserve forces to take part in the first phase of the war; only fully trained and prepared first-line troops will be capable of sustaining that shock. But after the initial attack has lost its momentum, large reserves will have to be brought into use to hold the enemy and to prepare for the final *coup de grâce.*

While the Army has to play the leading part in the cold war, both the Navy and the Air Force also have their parts in it; the Air Force has the major deterrent role, but all three Services would, of course, be fully engaged in a hot war.

As for the new weapons, atomic weapons are now being produced in the United Kingdom and already our Forces have some of them. "Guided missiles have reached an advanced stage of development, an air-to-air weapon will be the first to come into service and surface-to-air weapons will follow." Yet it must be borne in mind that new weapons and new methods of warfare will not entirely supersede the old, and that ships, ground troops and several kinds of aircraft will still be necessary to withstand the first shock, to hold the enemy and "to exploit and consolidate the tactical situation which the new weapons will create." And it must be understood that all these forces and their weapons and equipment must be kept within the resources of a limited defence budget.

In the circumstances, Her Majesty's Government have decided to effect a gradual change in the direction and balance of our defence effort. "Still greater emphasis will have to be placed on the Royal Air Force because of the need to build up a strategic bomber force and because of the importance of guided missiles in air defence." Research and development will still, and rightly, enjoy high priority. Expenditure on the Army, and its total size, will, subject to its commitments "as an instrument of Government policy," decrease; and the strategic reserve at home, which has been unavoidably dissipated of late, will, it is hoped, be built up again. Owing to the vulnerability and importance of our sea communications and the need for safeguarding them, especially in war, it is unlikely that expenditure on the Navy will be reduced below its present low level.

Her Majesty's Government are naturally concerned about the shortage of manpower and particularly of skilled technicians, while the fact that the Army and the Air Force are obtaining the majority of their Regular recruits, on a three-year engagement, from men who would otherwise be due for two years' National Service, causes too frequent turn-over of personnel and seriously restricts the number of experienced N.C.Os. available. Steps will be taken to induce more men to extend their initial engagements.

It is clear from the white paper and from the statements of Ministers in both Houses of Parliament that the Government is fully alive to the importance and possibilities of the new weapons which science is now placing at the disposal of the fighting forces, and to the changes in strategy and tactics which must follow their adoption. Mr. Nigel Birch (Parliamentary Secretary to the Ministry of Defence) said in the House of Commons on 2nd March, 1954: "We fully acknowledge today the dominance of air power and the lead of the offensive over the defensive in the air."

We must not, however, pin all our faith to air power and the atom bomb, for strategic air power, with or without the atom bomb, "cannot prevent armies advancing unless they are also opposed by conventional forces on the ground."

Again, the atom bomb used tactically will be decisive only against a concentrated enemy, and only opposing ground troops can force him to concentrate. One of the big problems is therefore to decide upon the required proportion between the "conventional" and the "unconventional" forces.

Mr. Birch advocated a forward strategy in Europe. "As the speed of aircraft increases," he said, "and as the range of guided weapons extends, so does the importance of depth in defence." We must hold as much of Europe as we can, for if our line is driven back, our warning system will become ineffective and our powers of retaliation much reduced.

In the House of Lords on 16th March, 1954, the Minister of Defence (Earl Alexander of Tunis) said that, as a result of a thorough review of global strategy, it had become necessary to change the emphasis in defence. The Royal Air Force would concentrate both on fighter defence (based on the most up-to-date control and reporting system) and on the bomber offensive. The possibilities of moving troops rapidly by air at short notice were being developed (90 per cent. of all trooping to the Middle East is now done by air), and high-speed, long-range aircraft would be given to Transport Command for this purpose, while Beverley freighters were on order for the transport of heavy military equipment as well as troops. The Royal Air Force now has its atom bombs, but we may not be told how many. An air-to-air guided missile has already reached an advanced stage of development.

Viscount Trenchard said that every bit of energy must be put in to avoid another Battle of Britain over England. "If that is not done," he said, "then we should be in a very difficult position." He also said that the Statement on Defence showed that an enormous responsibility was being placed on the Royal Air Force, and that that responsibility could be carried out "only if the production of equipment to go with the machines is parallel with the production of machines, and also if training and recruitment are parallel with the machines." If not, the machines would be useless. He further pointed out that the cost of overseas garrisons, in men and money, could be considerably reduced by substituting air power for ground forces, as had been very successfully done in Somaliland, in Aden, in the Sudan and in Iraq.

During the second day's debate in the House of Lords, Lord Tedder supported Lord Trenchard's call for the extension of air control in countries overseas for which we are responsible, and he thought that much more could be done in that direction in Malaya and Kenya than was being done at present. Air power should, in such places and in such circumstances, be used to relieve most of the ground troops and not merely to assist them. Its efficacy had been proved up to the hilt. He also strongly advocated strategic bombing. By strategic bombing he meant "bombing which is directly linked with operations on land and sea" as the bombing of submarine assembly yards in the last war was related to the anti-submarine campaign. Captured German documents had disclosed over and over again how our strategic bombing had been a major cause of their defeat. Moreover, against ground-to-ground rockets, bombing was the only defence. "The rocket," he said, "can be dealt with only at its source: launching points—they are difficult targets—storage depots, supply lines and factories."

Mr. George Ward (Under-Secretary of State for Air) introduced the Air Estimates in the House of Commons on 4th March, 1954. He said that the gross total air estimates for 1954-55 were £11 million less than those for the preceding year. This was not to be taken as indicating any less emphasis on air power. Indeed there was to be more emphasis on air power and more was to be spent on aircraft, armament and fuel than in 1953-54, but there were "large decreases in the provision for other types of equipment and stores and for works services." Our opinion of the paramount importance of air power was shared by our American friends, "who have decided to buy a substantial number of British aircraft for the Royal Air Force as an addition to what we ourselves can afford in the next few years." "The slight drop in our total estimate," he said, "is likely to be followed by rises in 1955 and 1956."

Mr. Ward also stated that the development of the Vulcan and Victor was going well and he hoped that these two medium jet bombers would not be far behind the Valiant in reaching the Royal Air Force. As the "V" Class bombers come into service, most—but not all—of the Canberra squadrons would be converted to the heavier type. Some Canberra squadrons would still be needed to give direct support to the Supreme Allied Commander, Europe, and they would also be used for reconnaissance. Canberras also afforded valuable training facilities for the crews-designate of the "V" Class bombers.

Turning to the re-equipment of Fighter Command squadrons with Swifts, the Under-Secretary of State said that the Hunters should also be ready this year and that the development of the Javelin was going well. He also told the House that prototypes of a new supersonic fighter were under construction and that twenty pre-production aircraft of this type had already been ordered. They would be shared by the Ministry of Supply and the Air Ministry and would save much valuable time in test flying.

The Javelin, he said, should be able to fly and fight at a height of over 50,000 feet and should have a speed of between 600 and 700 miles an hour. Being equipped with modern armament and modern radar, it would be able to find and attack the enemy in all conditions, even at these great heights and speeds. During the coming financial year (1954-55), he continued, the size of our night-fighter force would be doubled and a new mark of Venom would be brought in. More than half of the new night-fighter force would be fitted with a new form of search radar which would enable our fighters to detect enemy bombers in an air space more than three times greater than at present.

R. F. P.

VE DAY, 1954

BY MASTER PILOT R. E. WAKEFORD

SO we came in pilgrimage. On this day the air was clear and the bright sun of spring lit up the beauty of the cathedral, standing high above the green fields of Lincolnshire, seeming to call us to Their presence.

The winding, hilly streets led us to the shadow of the cathedral and, as we approached, we were joined in silent company with others. The quietly dressed civilian, now bearing himself in martial dignity, as the years rolled back on this day, the greying mother, humbly proud of her sacrifice, the officers of high rank with orders and decorations, the smattering of N.C.Os.—all joined as one, without rank, to pay tribute, to remember, to re-live.

In the lofted, vaulting cathedral all was quiet, save for the feet of the pilgrims entering and being guided softly to their places by the fresh-faced young successors to those they now sought to remember. A hushed whisper, the scrape of a chair—no more. The quietness enveloped us. In the distance the altar lights glowed softly, the sun streamed through upon the aged stones, the beauty of the windows was revealed.

Punctually, as ever in our Service, the civic party arrived and the packed congregation rose. The procession passed slowly to its place. Led by the Chief Constable and the bearer of the Sword of Richard II, the high civic dignitaries had come to join us in tribute. In the distance the band of Cranwell College filled the cathedral with music—Sursum Corda—Solemn Melody—Trumpet Tune and Air. Then loud, clear, uplifting the fanfare, heralding the arrival of the procession. Slowly they moved in pomp and majesty; the sun caught the silver of the cross, the richness of the banner of St. Oswald, the whiteness of the surplices of the choristers. The vast gathering was stilled as the long procession passed us. Perhaps the human-ness of the occasion was brought back to us by the squeak of the shoes of one of the chaplains, but still in awe and dignity they passed—the Bishop of Lincoln, the Lord-Lieutenant, the Commander-in-Chief. Then the main doors were opened wide and the sun streamed through as the ensign of the Royal Air Force was borne slowly down past us. Instinctively one stood a little higher, a little straighter as *our* ensign was laid upon the altar.

Now to the roll of drums came the National Anthem; at first the congregation, seeming as it were to return to the present but slowly, were faltering, but then voices raised and flung the words proudly around. "God Save the Queen"!

In quietness and solemnity the simple service began. "The strife is o'er, the battle done" we sang. We heard the Dean of Lincoln—"Do not imagine their sacrifice was in vain", "Time heals a sense of loss", "Have pride in their courage" —we had. We prayed, simply, sincerely.

Out of view moved our representatives, from groups and commands, from government and municipality, and with them two ladies who represented the families of the fallen. To the choir "How lovely is Thy Dwelling Place" they entered the Airmen's Chapel—the Chapel of St. Michael.

Through the loud-speakers we heard the presentation—"Mr. Dean, I ask that this window of stained glass. . . ." The acceptance—"We, the guardians of this cathedral church accept this gift. . . ." Rasping through the loud-speakers came the noise as the Commander-in-Chief unveiled the window. We listened to his simple tribute and joined the Bishop of Lincoln in the dedication.

Came a stillness, broken suddenly by the tap of a drum, then a crescendo of sound broke, now loud. now soft, upon us from the drums and clear and sweet the trumpets sounding the "Last Post." Yet as the crystal notes rang out, still came the throbbing of the drums, rolling wave upon wave of sound around us. So must the walls of this ancient place have reverberated to the airborne sounds of years gone by, as the bombers flew over and outwards, never to return. So must this cathedral have been the last visual link with the loved one of so many—and now today, the pain, the sense of loss was once more with us all—and the loved ones were here and linked again.

As the challenging sound of the "Reveille" was echoing in our ears, heads were bowed and quietly the proud tears of sorrow flowed. Here an ageing mother supported by the grey-haired husband who stood erect, proud and defiant, with eyes that saw yet did not comprehend. The widow alone in this company of great, the sweetheart still with *his* memory, thus their tears flowed quietly and brought solace. At this moment all minds sought and remembered their own particular sorrow and in their hearts pride in their men; now all, great and small were linked together by the common sacrifice.

The last hymn was sung, the blessing unheard by many, then, as the ensign of the Royal Air Force was slowly passed through the ranks, the sense of pride, of dignity, returned, and we stood erect as the banner was passed into the sunlight. It was over.

In a long procession we passed into the sunlight, all ranks, all stations in life walking together proudly through the streets of Lincoln to the castle grounds, led by the Lord-Lieutenant and his lady. Quietly we had tea on the lawns and then departed. Most retraced their steps and stood in homage before the window, then went their various ways. For one brief hour we had all, Air Marshal and airman, lord and lady, mother and widow, sweetheart, been members of that greatest of Services—the Royal Air Force.

REMINDER FOR CONTRIBUTORS

Articles for publication in the next issue must reach the Editor not later than 1st August, 1954. They should be addressed to:

The Editor of AIR POWER, Chaseley, South Cliff, Eastbourne.

By special permission of the Air Ministry, articles written by serving officers may be sent *direct* to the Editor, who will obtain the necessary official sanction for their publication. The interest and general layout of most articles are greatly added to if illustrated; photographs, maps or sketches should be included when possible.

The editorial policy is to dwell less on the past and more on what is taking place in the Air Forces today or what will encourage useful discussion upon the future.

The scale of payment will depend upon the nature, quality and general interest of articles rather than their length.

For planning, the JOURNAL articles should be as nearly as possible 1,200 words (two pages), 2,500 words (four pages). The maximum should not exceed 4,000 words. A brief outline of articles contributors propose to write, if submitted to the Editor, would be helpful and might even bring suggestions as to the lines of development which would be most acceptable.

"WAR IN THE AIR"

AN ACCOUNT OF THE B.B.C. FILM SERIES

By FLIGHT LIEUTENANT G. E. LANNING, R.A.F.

"A WEALTH of authoritative information on the topic of the use of air power in modern war" was what our Editor was able to offer us at the beginning of 1954. As the year draws to its close, the B.B.C. will give us similar fare in the form of a series of television film programmes entitled *War in the Air.*

The series consists of thirteen half-hourly programmes presented weekly, commencing in November of this year. The main theme is the tracing of the history of the last war with special emphasis on the use of air power in the European theatre of operations. In the B.B.C.'s own words, "Although the films will give due credit to all the allied air forces and will include much captured enemy material, they will deal mainly with the part played by the British and Commonwealth Air Forces in the past war and will stress Britain's development as an air power both before and since." Thus, although the series is aimed at the general public, it will obviously be of special interest to us, the readers of this magazine.

A great deal of thought and labour lies behind this project. The idea of producing a series of films about the Second World War was first suggested in 1947, but the circumstances at that time were such that the project had to be dropped. In 1952 the subject was reopened with Air Ministry, and in 1953 work commenced on a series devoted to *War in the Air,* to be made with the full co-operation of the Air Ministry and also of the Admiralty, the War Office, the Ministry of Supply and the Central Office of Information. A production unit was formed under the general direction of Mr. Philip Dorté, O.B.E., head of television films, and the team set to work in a specially provided suite of rooms at Alexandra Palace.

Most of the work became the responsibility of Mr. John Elliot, the producer. His first task was to discover what existing film material was available. The three Services put their film libraries at his disposal and before long he was in danger of being swamped by the enormous number of films containing relevant information. Within six months of starting production, he had worked through five million feet (approximately 900 miles) of film. From this maze of material he had to select those shots which best suited his theme. The various sequences were integrated into the individual films and then further cutting had to be carried out to bring the length of each film down to the requisite half-hour's running time.

Unfortunately for the producer, the films from the Service libraries did not cover completely all the facets of the air war which he wanted to portray. This was especially the case in the early films which deal with that part of the war before the R.A.F. Film Unit was formed. In order to fill the gaps in his sequences, Mr. Elliot had to shoot specially reconstructed scenes. Here again, co-operation with the Air Ministry was excellent. Let me quote an example. In order to cover all aspects of the Battle of Britain, the producer required shots of a fighter group operations room. The battle had been covered adequately from the flying and Civil Defence angles, but apparently there was no official film material of a group operations room of that period. Obviously, special shots would have to be made. The B.B.C. appealed to the Air Ministry, and the Ministry referred the matter to No. 11 Group Headquarters, which group of course was responsible for directing the major part of the operations during the Battle of Britain. Fortunately the original group operations room was still in existence although it had long ceased to be used as an operations room. An officer was detailed to reconstruct the room as it had been in 1940, and then this special sequence was shot and eventually interwoven into the rest of the film.

Meanwhile the producer was busily preparing the scripts. In this, he was assisted by a war-time W.A.A.F. officer who had been recruited to the B.B.C. for this specific task. When the scripts were ready, they were submitted for approval to the Air Ministry, where they frequently underwent several modifications. Throughout the making of these films there was complete concord between the B.B.C. and the Air Ministry, and as Air Chief Marshal Sir Philip Joubert acted as technical adviser during the editing, writing and recording stages, there should be little cause for criticism on the grounds of authenticity.

War in the Air consists of thirteen films. The first one covers the story of the inter-war years, the outbreak of war and the "phoney" war. Its great interest to students of air warfare lies in its portrayal of the rise of the German Air Force whilst the modern Royal Air Force was still in the blue-print stage. The ruthless use of the G.A.F. as a tactical weapon is vividly illustrated. The second film deals primarily with the Battle of Britain. In it we see not only the part played by our gallant pilots, but also the quiet, courageous resistance offered by those on the ground in the target areas. Some of the shots of the Civil Defence in action are most inspiring, whilst one particular view of blossom in a Kentish orchard recalls vividly the beautiful weather of that never-to-be-forgotten summer. The greatest lesson in this film is surely that modern war is total war, that the morale of the civilian population must be as high as that of the fighting forces.

In the third of the series, the leading role is taken over by Coastal Command, and we witness the early precarious stages of the Battle of the Atlantic; whilst in the fourth, the war is carried to the enemy by Bomber Command and the first "1,000 Bomber Raid" hits the headlines. Further films are devoted to the operations in the Middle East, the air battle for Europe, the Essen dam raids and the second front, D Day and the liberation of France, the battle for the eastern oceans, the defence of London against the V1's and V2's, and victory. Finally there is a film devoted to the post-war air power of this country which includes up-to-date shots of the present strength and future potential of the Royal Air Force. This film also illustrates fully the growing need for the integration of the air forces of the N.A.T.O. countries and their role in the defence of the European community.

This series of films is a documentary of the whole war, although its emphasis is on air warfare. The sequences in it come mainly from films which were made during the war, frequently in the battle area. The films are not Royal Air Force propaganda, but the great lesson of the war is there for everyone to see, to see, moreover, by his own fireside, that in modern warfare the air war must be won before final victory is possible. This is the view-point of which students of air power have been trying to convince the country for many years. Now the B.B.C. is doing the job for us. Let us hope that *War in the Air* will drive home to the whole population the importance of maintaining our air strength at its maximum efficiency.

LETTERS TO THE EDITOR

From Captain S. W. Roskill, D.S.C., R.N., Retd.

SIR,

In the Winter, 1953, number of AIR POWER appears an article from the pen of Marshal of the Royal Air Force Sir John Slessor entitled "Maritime Air Power." In the Editorial of the same number you state that you offer your readers "a wealth of authoritative information," and in commending Sir John's article to your readers you draw attention to "its authoritative facts and figures." From these statements the reader might conclude that Sir John's facts and figures are derived from the best available official sources, and that where another Service is concerned that Service, if consulted, would agree with them.

On matters of opinion, such as the future of aircraft carriers, Sir John's views will doubtless be treated with the respect they deserve; but they will still remain matters of opinion. What is more important is that where facts and figures are quoted regarding past experiences they should be made as accurate and as complete as possible, and that conclusions should not be suggested or drawn where this is not the case. It is with that aspect of Sir John's article that I am primarily concerned.

The first of Sir John's statements with which I find myself widely at variance concerns the size of the British Merchant Navy. He gives the total of 9,488 "*merchant vessels under British ownership*" at the beginning of 1941. The figure quoted by him appears, however, to be the total of merchant ships, fishing vessels, tugs, harbour craft, etc., registered in Britain *in 1939*. It is a very misleading figure to use as an indication of the size of the Merchant Navy, since a large proportion of that total was not under United Kingdom control and, because of its type and location, could only contribute indirectly, if at all, to the supply of these islands or to the general prosecution of the war. It is not easy to produce a realistic figure for the size of the Merchant Navy, but the shipping over 500 gross tons (tankers and non-tankers) on the last day of December, 1940, was 3,312 ships of 16,077,000 gross tons. Sir John next states that 650 (presumably British registered) ships had been lost by the beginning of 1941, 95 of them to air attack. This may be taken as approximately correct; but Sir John's figure does not indicate the results of the enemy's varied onslaught on merchant shipping, because a great many allied and neutral ships (some of them on charter to this country) were also lost. The aggregate effect of the enemy's effort is best indicated by the fact that by the end of 1940 the total of British, Allied and Neutral Merchant Shipping sunk was 1,281 ships of 4,747,033 gross tons, of which 202 ships of 583,023 gross tons were sunk by air attack.

Sir John later discusses the numbers of German U-boats sunk by carrier-borne and shore-based aircraft. This is an example where figures which seem to me to be incomplete have been used to draw too definite conclusions. The conditions of the war against submarines varied greatly in different theatres. In the Mediterranean they favoured the shore-based aircraft (*pace* the splendid work of the Malta-based ones of both Services), especially in the later phases, because of the many favourably placed bases from which they could work. In the Pacific the great distances between bases generally favoured the carrier-borne aircraft. An analysis of the accomplishments of both types, to be as complete as we can make it needs to include Italian and Japanese submarines sunk, in order to allow for variations in conditions in all three major theatres of the war at sea.

It should also take account of the strength available to—or the sorties flown for a particular purpose by—each type of aircraft. The smaller the strength available, or the fewer the sorties flown per submarine sunk the greater the accomplishment of each sinking. The matter is a very complicated one, on which I certainly am not prepared to dogmatize. Sir John does not say what theatre(s) are covered by his figures of 38 German U-boats destroyed by carrier-borne and 83 by shore-based aircraft employed on convoy escort and support duties. I think they refer to the Atlantic and, if that is so, I do not disagree materially over the figures; but they are much too incomplete to justify Sir John's implication that because *in that theatre* shore-based aicraft killed "more than twice as many" submarines as those carrier-borne they are therefore twice as effective as submarine killers. If the Pacific theatre only is taken a precisely opposite conclusion could in fact be drawn; and in the Arctic theatre, where most of the air escorts and support were provided by carriers, it is not surprising to find that they killed nine (plus four shared) to the shore-based aircrafts' two. Later in his article Sir John gives a very justifiable warning that "statistics do not always present an entirely fair picture"—a caution which might, I think, be applied to his own statistical analysis of the air's great contribution to the defeat of the U-boat.

Sir John's table of enemy ships sunk by various air weapons and services also needs to be treated with the greatest caution, because of its inevitable incompleteness and, again, of the number of imponderables involved. It emphasizes, quite rightly, the great contribution of the air mine-laying campaign against enemy coastal shipping; but in other respects the lack of data renders it a most unreliable guide to sound conclusions. I will give a few examples of what I mean. In one of the few sea battles of the last war which can justly be described as decisive—the Battle of Midway—virtually all the damage to the enemy was accomplished by carrier-borne aircraft, while the considerable numbers of shore-based aircraft involved contributed very little. Had the United States Navy's carrier-borne aircraft not achieved that spectacular victory the whole course of the war in the Pacific would have been altered. Yet this fact, let alone the possible conclusion which might be drawn, seems to be totally ignored in Sir John's table. Equally it is not clear whether the success of a small number of British carrier-borne aircraft in sinking the three Italian battleships in Taranto harbour in November, 1940, is included; nor does allowance appear to be made for the vital contribution of the carrier-borne aircraft of the *Victorious* and *Ark Royal* to the ultimate sinking of the *Bismarck*. In the case of the attack on Taranto and the *Bismarck* operation shore-based reconnaissance aircraft of the Royal Air Force also played a most important part. How can all these factors possibly be expressed reliably in statistical form?

I note that in your editorial remarks adjacent to Sir John's article you deprecate "references to acrimonious service jealousies of long ago." On the opposite page to this quotation Sir John writes that the "Inskip award of 1937—which has since been largely disregarded—*retained shore-based aircraft as the responsibility of the Royal Air Force.*" (My italics.)

The recommendations of the Inskip Enquiries of 1936 and 1937 have not been published, but it is widely known that as a result of them the Government of the day transferred complete responsibility for the ship-based aircraft of the Fleet Air Arm from the Air Ministry to the Admiralty. On the other hand, shore-based aircraft of *Coastal Command* remained entirely under Air Ministry jurisdiction until, as Sir John doubtless remembers, operational control of them was transferred to the Admiralty in 1941. The suggestion that the 1937 investigations were concerned with *all* shore-based aircraft appears therefore to be incorrect.

I am, Sir,
Your obedient servant,
S. W. ROSKILL,
Captain, R.N., Retd.

From Marshal of the Royal Air Force Sir John C. Slessor,
G.C.B., D.S.O., M.C. (late Chief of the Air Staff, Royal Air Force).

SIR,

I do not propose to indulge in an argument with Captain Roskill. The facts and figures given in my article are accurate and in no sense misleading.

If Captain Roskill can produce other facts and figures on the subject of British naval aviation in the late war (the subject of my article), which would lead to different conclusions, no doubt your readers—including Captain Ryder, M.P.—will be delighted to see them.

Yours, etc.,
J. C. SLESSOR.

After the most careful consideration of all the points raised in Captain Roskill's letter, in the absence of other equally authoritative facts and figures on the subject of naval aviation in the Second World War, which would permit other conclusions to be reached than those given to us by Marshal of the Royal Air Force Sir John Slessor (late Chief of the Air Staff), we are not prepared to alter in any way the statement in our Editorial (Winter Number of AIR POWER, 1953).

Being fully aware that Sir John Slessor obtained his figures from the best available official sources, and having had these figures again checked at the official source, we repeat:

"*The article in question contained authoritative facts and figures*" and "*offered our readers a wealth of authoritative information on the absorbing topic of the use of air power in modern war.*"

We do not, in this statement, suggest that all members of the Royal Navy are likely to agree with Sir John Slessor's conclusions.

Despite our Editorial note, which followed Sir John Slessor's article (Winter Number, 1953, page 125) that: "We regret to see references to acrimonious Service jealousies of long ago," it was unfortunate that Captain Roskill, in his letter, should have again brought up the old question of the Inskip Award of 1937, as he also considers it one of those acrimonious Service jealousies of long ago; thereby entirely disregarding our expressed wishes in this matter.

Under all the circumstances, however, we thought he might consider it not a little unfair if we did not publish his letter in full.

EDITOR.

DEAR SIR,

I have no desire to use the pages of AIR POWER to engage in private argument with Squadron Leader Long. However, after a further "careful" reading of his July article, I still contend that his logic is at fault. When one offers a conclusion one must also supply the premisses. I do not disagree with his analysis of the organization of State and Party in the U.S.S.R., but I maintain that it does not contain the necessary premisses for the conclusion which he draws.

Moreover, I must insist that I did not suggest that there has been any change of heart in the Soviet Union. On the contrary, my sole purpose in writing to you, Mr. Editor, was to deplore the tempting but dubious practice of looking for either a softening or a hardening of the heart in the changing face of Soviet policy. It is generally recognized that, during the past year, there has been a change in Russian policy, directed, it seems, towards easing international tension—at least, Her Majesty's Government is conducting its own policy on that assumption. As regards this change of attitude, I can only repeat that Squadron Leader Long's forecast accords ill with subsequent events. Nevertheless, to argue that it portends a change in the character of the Soviet dictatorship would be unwise. I have not been able to read "all the relevant documents published on the Soviet side," but such as I have read would suggest that the present shift is attributable to internal economic strains. If that is the case, it provides but another example of my contention that it is idle to attempt to relate Russian foreign policy to any fixed political doctrine or to any set system of political organization. The history of the Soviet Union over the last thirty-five years teaches us quite plainly that the totalitarian character of the Soviet system remains much the same but that its external policy changes to meet varying circumstances and to serve Russia's own immediate needs in the world.

I am pleased that your correspondent agrees with my estimate of the series "Through Soviet Eyes"; and I hasten to agree with him that anyone who takes the problem of Russia seriously must look farther than *The Times* or even the Squadron Leader's own articles, for the evidence upon which to form his judgments. That is precisely why I drew attention to two works based upon primary evidence to which neither Squadron Leader Long nor I have access.

Yours faithfully,
A. C. KERR,
Squadron Leader, Royal Air Force.

DEAR SIR,

From what your correspondent now says, it would appear that I am being taken to task for making a wrong appraisal of Russian foreign policy. This is indeed an odd accusation to make when my original article did not set out to discuss this topic; it was, as you will remember, Mr. Editor, a comparatively restricted study of certain changes in the Soviet hierarchy. A discussion of shifts in Russian foreign policy might well have been more interesting and nearer your correspondent's heart, as it would have been nearer my own, but in the context of the article it would have been irrelevant. The simple exercise in logic which your correspondent makes at my expense is equally irrelevant since it is based upon a mis-reading of what I wrote.

Had I been writing on Russian foreign policy, however, I think Squadron Leader Kerr would have found that there is really much that we agree on. I stand nearer to the Beloff conception of Russian foreign policy than he does. He is, of course, entitled to his opinion on the "two works based upon primary evidence," and so, I hope, am I. Having worked for many years now from the same source material as that used by Mr. Ebon and Mr. Deutscher, I remain wholly unimpressed by the two books which your correspondent apparently regards as valuable.

Yours faithfully,
JOHN F. L. LONG,
Squadron Leader, Royal Air Force.

CRICKET IN THE ROYAL AIR FORCE

By Squadron Leader L. H. Clint, R.A.F., Hon. Secretary, Royal Air Force Cricket Association

AS so often happens, the first week in May turned out cold and wet and first-class cricket got off to a rather bad start. Play was seriously curtailed in most of the matches and scoring was generally low.

The match between Derbyshire and the Royal Air Force was one of the many games to suffer from the weather and, in fact, not a ball could be bowled until 3.30 p.m. on the second day. As a result there was never anything in the game which was a great pity for Derbyshire had paid us the compliment of fielding their strongest available side.

Ilkeston, where the match was played, is seven miles west of Nottingham and just inside the Derbyshire border. It is a delightful little ground which has been the scene of many stirring tussles in the past, particularly with neighbouring Nottinghamshire.

Sitting in the pavilion gazing at the wicket through a steady drizzle of rain I chatted with umpire Harry Storer, and we recalled the occasion on this ground when he compiled a three-figure innings for Derbyshire with a large crowd of Nottinghamshire supporters shouting to him to get himself out to let Nottinghamshire win and so gain the championship. Harry eventually did get out and Nottinghamshire did win but it did not give them the championship for they were unexpectedly beaten in their final match by Glamorganshire, then the babes of the competition.

In some ways, however, it was probably just as well that the Royal Air Force were let off lightly in this opening game. Despite the presence of six old caps, Squadron Leader Shirreff, the Rev. W. E. G. Payton, Flight Lieutenant Fenner, Flight Lieutenant Leggett and Aircraftmen Horton and D. Smith, the team had had no previous opportunity of settling down together, nor had many of them had any real chance of serious practice. The newcomers to the side were Aircraftmen B. A. Langford (Padgate and Middle Wallop), M. J. Cowan (St. Athan), D. Parker (Full Sutton), J. T. Murray (Innsworth) and R. A. E. Tindal (Hill House, Stanmore).

Langford and Cowan are established County players, having already become prominent with Somersetshire and Yorkshire respectively. Murray opens for Middlesex II and has played for the County and Tindal is a promising member of the very strong Surrey 2nd XI. The selection of Parker is interesting because although he has played for Yorkshire II and opens for Bingley in the Bradford League, he has earned his promotion to the representative eleven on his consistent performances throughout last season with his station and command teams. This should be of great encouragement to all regulars, some of whom may have been inclined to think that they have very little chance of a cap in competition with young professionals coming into the Service under the National Service Act. I must emphasize that although the competition for places is undoubtedly keen, the door to the representative side is wide open and we have recently increased our efforts to ensure that all worth-while talent is brought to our notice.

Turning again to our match against Derbyshire, when, at last, it was possible for play to start the Royal Air Force won the toss and Squadron Leader Shirreff asked Derbyshire to bat. Cowan and Shirreff opened the bowling against Hamer and Kelly who gathered runs steadily until Shirreff gave way to D. Smith.

Smith, who plays for Stockport (Central Lancashire League) and Cheshire, goes up to Cambridge in September and looks very well placed for an early blue. He managed to get a lot of pace from the wicket and quickly bowled Hamer. He followed this by bowling the Derbyshire captain, Guy Willatt, and had Donald Carr caught by Shirreff at slip. Morgan joined Kelly but never had the chance to settle, being lbw to Cowan for eight. Shortly afterwards Cowan clean bowled Wyatt. At this stage half the Derbyshire wickets had fallen for 128. Nothing, however, could stop Kelly and he went placidly on to get his second century in successive innings. In view of the short time left available for play Willatt then declared the Derby innings closed at 210 for six.

On the third day the weather showed little improvement and it was cold and wet when the Royal Air Force opened their innings against some very hostile bowling from Gladwin and E. Smith. Gladwin soon showed that he was in devastating form and wickets fell rapidly, only Tindal—who got thirty-six—and Langford—who scored twenty-three, not out—putting up any serious resistance. The Royal Air Force were all out for 108, thus failing by two runs to save the follow on. By that time only one hour remained for play and stumps were drawn with the score at fifty-six for two wickets, Parker being not out twenty-six, and Murray not out twenty.

Apart from Kelly's century the outstanding feature of the play was undoubtedly the Royal Air Force fielding which was first class in every way. This was most encouraging and holds much promise for the future.

Fenner, as usual, kept wicket with great skill. Extras produced only five, of which two were leg byes and three came from no balls. With the retirement of Don Brennan from big cricket, there is no doubt that Fenner must now come very seriously into the reckoning as wicket-keeper for the Gentlemen *v.* the Players.

At the time of writing we are now making arrangements for the representative trial to be held at Henlow on Friday and Saturday, May 21st and 22nd, and this will be quickly followed by the match against Northamptonshire. At the moment the bowling—particularly as Pilot Officer Tom Hall (Somersetshire) is now available—is not causing any worries but it would certainly appear that the batting needs stiffening if the team is to put up a really good show against its County opponents. Maybe the trial will solve this problem for us.

By the time this article appears in print the cricket competitions will be well under way. The draw has already been made and in the Command competition last year's finalists—Flying Training Command and 90 Group—meet each other in the preliminary round. The Command competition appears very open this year and Flying Training Command will have some stiff opposition to overcome if they are to repeat last year's success.

IT'S YOUR LIFE I'M AFTER

HE has just left me. I am feeling rather limp. I never was very good at figures and I've got a slight feeling of guilt. It's pretty clear that I ought to have insured my life years ago. As he said, I might die tomorrow, or even tonight. Then again I might live to be sixty-five, in which case, under the All Stars policy, I would receive—how much was it?—£2,250 in cash and a bifocal annuity payable quarterly in arrears.

He explained it all very fluently. I wish I could remember it better. His company—The Spacial and Heavenly Bodies Allied Mutual Trust and Esteem Assurance Company—employ specially trained back-room boys who work out the odds with seven-figure log tables. Also they have lots of statistics and graphs and time-tables. No insurance problem is too small and none too great for them. They computed the mortality of performing fleas as the basis of a policy taken out by the proprietor of a flea circus. They investigated the incidence of varicose veins and corns in ballerinas.

Let me illustrate what the company can do for *you*.

Take the case of a lion-tamer, aged twenty-nine next birthday, suffering from super-tax. Obviously the cosmic tin-hat policy is just the job for him. It covers all risks including kissing the lioness when she's having cubs and insertion of head into king of jungle's jaws just before lunch. There is no guarantee under the latter claws that with revulsions you get back most of what you put in, nor alternatively a life annuity for the widow if past the age of lion-taming.

Then there's the bowler-hat policy specially drawn up for group captains, and also the heavenly way contract for prone-position pilots. The bowler-hat job is very attractive. The wise young acting pilot officer on probation takes out one of these policies at the age of, say twenty-one, the contractural period (as we call it) being fifty years. Premiums are graded optimistically to suit his assumed successive promotions and corresponding increases in pay, the final premium being approximately equal to the second-hand value of a group captain's head-dress. It has been calculated that, having regard to rebates on income tax and after deducting the gross assessed value of the alleged reversionary bonuses, the survivor of such a contractural period would be very lucky indeed.

The steady improvement in the mortality of policy-holders is one of the major factors contributing to the amenities of social development and, of course, has a side-kick on promotion prospects. Your future orphan's education can be secured by instalments out of income, and you share with your wife the comfort of knowing you need only live long enough to pay the first premium, double cremation fees being included in the comprehensive policy at a small additional charge.

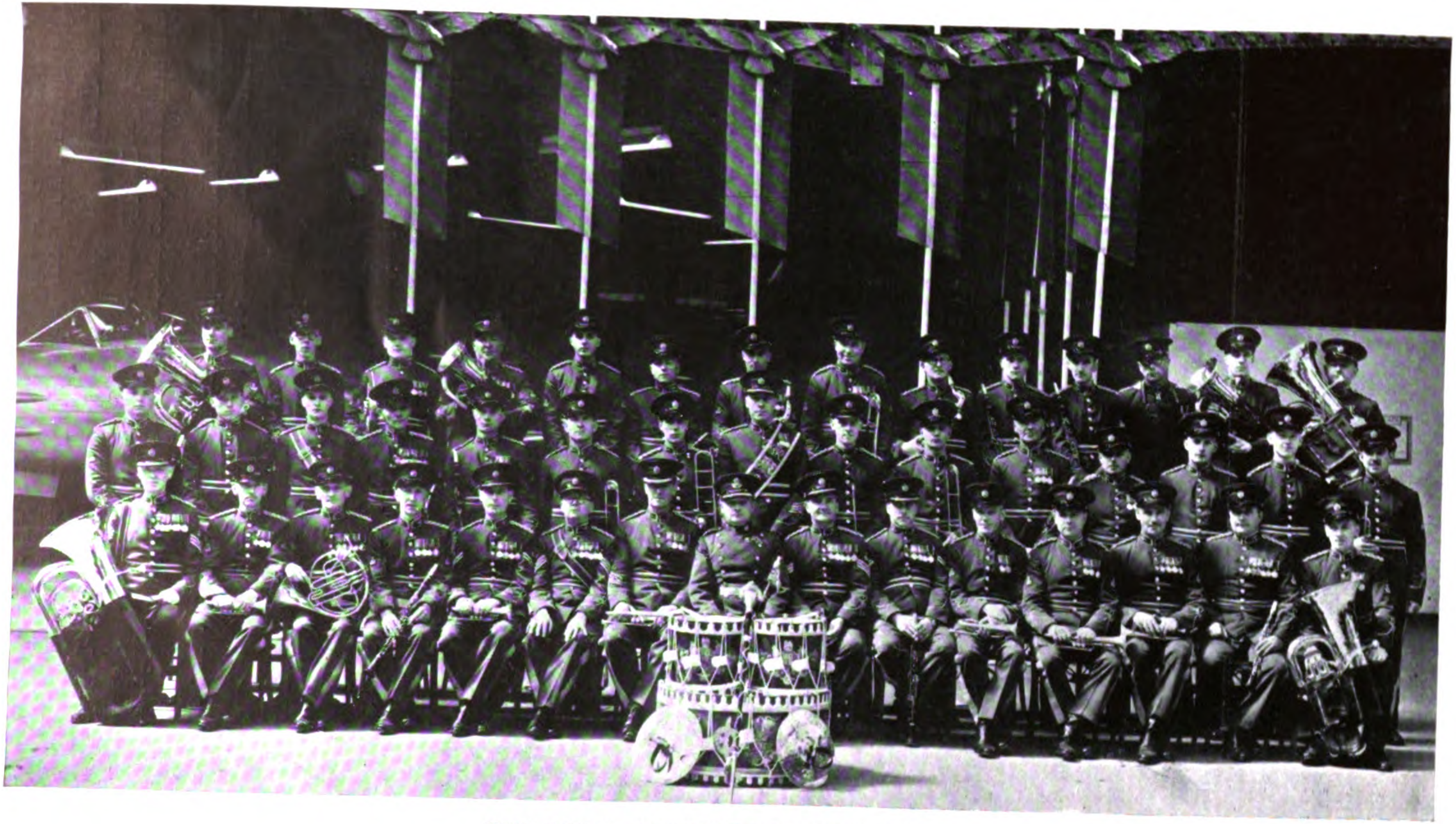
I should perhaps explain why I'm telling you all this.

The fact is The Spacial and Heavenly Co. Ltd. are on the look-out for chaps with personality to act as sub-agents. As a sub-agent I get a regenerative discount on my own premiums and a cut in the kitty for any new customers I introduce.

I hope I have said enough to make you realize that you can't ever afford never not to insure more. As the dypsomaniac said to the barmaid, "Don't let it be a case of too little too late."

H. R. P. P.

This is to certify that any reference to, or slight upon, any person or thing, alive, dead (wholly or regionally), except the author himself, is unintentional.—AUTHOR.



THE ROYAL AIR FORCE CENTRAL BAND
which includes PAST and PRESENT members.

CURRENT EVENTS

Royal Air Force Central Band

THE recent visit of sixty musicians of the Royal Air Force Central Band to Malta and Gibraltar, led by Wing Commander A. E. Sims, O.B.E., Organizing Director of Music, Royal Air Force, who conducted this band when playing before Her Majesty The Queen and The Duke of Edinburgh during their visits, is a reminder of the extensive programme of visits all over the world undertaken.

The R.A.F. Central Band was formed in 1920, and has played, in war and peace, all over the world. Its music has achieved great popularity on radio and gramophone in many countries.

Among the achievement of which the Central Band is most proud is that in 1923 it made the first broadcast by a military band from Marconi House, and in 1925 was the first military band to give a Command performance. Since the 1930's the Central Band has travelled thousands of miles through the U.S.A., Canada, Switzerland, Holland and Western Europe.

A section of the Band was with the Advanced Striking Force in France in the earliest days of the war, and another section was at Arras when the Germans broke through at Sedan. The section got back to Britain without casualty or loss of an instrument. During the war the Band recruited over 1,000 musicians who, in small parties, played at the battlefronts of the world, and throughout the United Kingdom. The Band's U.S.A. coast-to-coast tour was made in 1944.

A function at which the orchestra section of the Band played in 1945, and which its musicians will never forget was the dinner party given after the Potsdam Conference by Sir Winston Churchill. The diners included Mr. Clement Attlee, Mr. Anthony Eden, Field-Marshal Alexander, President Truman, General Marshall, Marshal Stalin and Mr. Molotov.

The Central Band also played during the Jubilee celebrations, and at the funeral of King George V, the coronation, silver wedding and funeral of King George VI, and the wedding and coronation of Queen Elizabeth II. It was also present at the Royal reviews of the R.A.F. at Mildenhall, Suffolk, in 1935, and at Odiham, Hants, last year.

In the illustration which accompanies this brief summary of the Central Band's activities, it may well be that some of its present members look a little younger than they do today, as, most unfortunately, we were unable to obtain a more recent photograph of this fine-looking body of men.

R.A.F. Regiment Now Has its Own March

The Royal Air Force Regiment now has its own march, *Per Ardua*, named after the Royal Air Force Regiment motto. It will be heard for the first time in London when the R.A.F. Regiment Band plays it daily at the Royal Tournament.

The march was recently composed by Wing Commander A. E. Sims, O.B.E., Organizing Director of Music, R.A.F., and in its opening bars are symbolized the rattle of Sten guns and the staccato cracking of the Bofors guns used by its light anti-aircraft squadrons.

W.R.A.F. Officer Joins Glider Club in Germany

The Women's Royal Air Force of 2nd Allied Tactical Air Force in Germany are out to prove they can fly as well as the jet men—in gliders. At the moment the R.A.F. think their reputation is pretty safe, because a recent examination of the lists of 250 last-year members of the Command's nine gliding clubs revealed not one airwoman.

As this season opened, however, Flight Officer Joy Laing gave the W.R.A.F. in Germany their first lead by joining the gliding club at R.A.F. station, Wahn.

A.T.C. Efficiency Trophy Presentation

Air Marshal H. T. Lydford, Air Officer Commanding-in-Chief, R.A.F., Home Command, recently presented the Sir Alan Lees Trophy to No. 384 (Mansfield) Squadron, Air Training Corps, as the 1953 most efficient A.T.C. Squadron, at a parade of four hundred cadets of the Nottinghamshire Wing in the Market Place, Mansfield.

The Duke of Portland, K.G., President of the Mansfield Squadron, was present at the ceremony and a civic luncheon was held afterwards, which was also attended by the Mayor and Town Council of Mansfield, Air Commodore Lord Sherwood of Calverton, Air Commodore R. L. Kippenberger, Air Officer Commanding No. 64 (Northern) Group, R.A.F., and Mr. H. B. Taylor, M.P.

The Sir Alan Lees Trophy is the A.T.C.'s premier award. It is awarded annually by Home Command, to the A.T.C. Squadron with the best all-round standard of efficiency. Some 800 squadrons competed for the trophy.

A.T.C. Now World's Biggest Gliding Organization

Britain's Air Training Corps now has the largest gliding organization in the world. France comes a close second, with its many civilian gliding clubs. The A.T.C.'s claim to be the largest is based on the number of pupils and instructors continuously engaged throughout the year at its numerous schools, the hours of flying and the number of launches.

Achievements for 1953, just compiled, include the following (1952 figures in brackets): Launches, 97,114 (92,584); hours of flight, 7,346 (not recorded); certificates issued, 1,478 (1,184); cadets qualified proficient—"B" Certificates, 1,403 (1,130); cadets qualified advanced—"C" Certificates, 71 (54).

These figures show that with only 4 per cent. increase in launches over the previous year, the number of proficient and advanced cadets increased by 24 per cent. and 29 per cent. respectively. Among the improvements made during the years which contributed to these results was the re-equipment of schools with two-seater gliders. There was a high standard of instruction, and much hard work by gliding school staffs. Reasonable gliding weather during the year was another factor.

There are now 44 A.T.C. gliding schools in the country. The outstanding school during 1953 was No. 89 (Christchurch, Hants) which trained 101 cadets during the year. No. 104 (Martlesham Heath, Ipswich), No. 116 (Hawkinge, Kent), and No. 168 (Detling, Kent) gliding schools have trained over 70 cadets each. At the Instructors' School, also at Detling, 326 students attended 28 weekly courses.

No. 19 Squadron Wins Air Firing Trophy

The Dacre Trophy, awarded annually to the Regular Squadron of Fighter Command showing the greatest proficiency in weapons training, has been won by No. 19 Squadron (Squadron Leader B. Beard, A.F.C.) for the 1953 competition year. Runner-up was No. 56 Squadron.

The trophy goes to the Squadron achieving the best results during attendance at armament practice camp. Emphasis is placed on live air-to-air gunnery, and all pilots in a squadron must take part. Units are also assessed on the year's weapon training effort.

Dunning Memorial Cup

The Dunning Memorial Cup for the Royal Air Force Squadron achieving the highest standard on the Joint Anti-Submarine School Training Course during the year has been awarded to No. 217 Squadron for 1953. The Squadron is equipped with Neptune aircraft, and is commanded by Squadron Leader P. H. Stembridge, D.F.C., A.F.C.

Presentation of Standards to R.A.F. Squadrons

At a ceremony held on R.A.F. Station, Khormaksar, in April the Governor of Aden, Sir Tom Hickinbotham, presented No. 8 Squadron, Royal Air Force, with the Standard awarded by King George VI. No. 8 Squadron, commanded by Squadron Leader A. J. Houston, has served in Aden over a period of twenty-five years, and is the senior fighting force in the Colony.

No. 502 (Ulster) Squadron, Royal Auxiliary Air Force—the Squadron which achieved the first sinking of a German submarine detected by A.S.V. (air-to-surface vessel) radar in November, 1941—received its Squadron Standard at R.A.F. Station, Aldergrove, Northern Ireland, on 24th May. The Standard was presented by the Governor of Northern Ireland, Lord Wakehurst.

Air Chief Marshal Sir Leslie Hollinghurst, a former Air Member for Personnel, presented the Squadron Standard to No. 5 Squadron, 2nd Tactical Air Force, at Wunstorf, on Saturday, 24th April. He was a member of the Squadron in 1921. No. 5 Squadron (Squadron Leader P. V. Ayerst, D.F.C.) will be the fourth unit of the 2nd Tactical Air Force to receive a Standard. No. 5 Squadron, formed in July, 1913, at Farnborough, Hants, flew to France in August, 1914, and on 28th August gained the first Royal Flying Corps aerial victory when a German aircraft was forced to land by an unarmed Avro biplane. On 22nd November the Squadron recorded the first actual aerial combat to result in an enemy aircraft being forced down by gun-fire from the air.

Army-Royal Air Force Co-operation in Malaya

A lonely airstrip at Benta, in a remote region of Pahang Province in Malaya, provides an excellent example of Army-Royal Air Force co-operation in the struggle against the Communist-inspired terrorists. Austers of No. 1914 Air Observation Post Flight are flown from here by Royal Artillery officers or Glider Pilot Regiment sergeants, while R.A.F. personnel service and maintain them. Royal Artillery men also operate the Flight's signals section, which keeps contact with the Austers in flight; while the motor transport yard, flight orderly room and cookhouse are jointly run by Army and Air Force mechanics, clerks and cooks. No. 1914 A.O.P. Flight is detached to Benta from No. 656 (Air Observation Post—Light Liaison) Squadron, R.A.F., whose other flights are strategically based elsewhere in the Federation and in Singapore.

No. 1914 Flight's airstrip—a narrow, grassy, often muddy, runway set amid jungle-strewn hills—is flanked by a main road and tall rubber trees, while at one end cluster the native-style "basha" huts in which the soldiers and airmen live and work. The Austers which use it are playing a valuable part in the air operations against the terrorists. Daily they leave on varied missions. One may be flying an officer to another remote outpost and another may be searching for terrorists or their camps, while others may be assigned to supply or leaflet dropping, in which event the Flight's own "supply-dropper," the "Selrick" Auster—named after Captain J. Sellers, D.F.C., R.A., a pilot, and Corporal P. R. Rickards, B.E.M., an R.A.F. engine fitter (both now back in Britain)—is called upon. Supplies which it parachutes to ground security forces will include

[Air Ministry Photo

HER MAJESTY THE QUEEN AT UNVEILING OF MALTA MEMORIAL

Her Majesty inspecting officers and airmen of the Royal Australian Air Force.

rations, wireless sets, batteries, mail, cigarettes and other essentials. Once, paper money and coin weighing 80 lb. were dropped to a jungle fort. Leaflet dropping long ago became routine to the Flight, which in the past year has showered some 2,000,000 leaflets over Northern Malayan terrorist areas.

Requests for air co-operation reach the Flight in a steady flow from outposts in the north-eastern States of Pahang, Tregganu and Kelantan. To meet them the Auster pilots must fly over some of the wildest mountain regions in the Peninsula, where diversion facilities are non-existent. At certain seasons these hazards are added to by atmospheric turbulence, low cloud and heavy rain storms.

Air Minister Attends Malta Memorial Unveiling

The Secretary of State for Air, Lord De L'Isle and Dudley, V.C., and Lady De L'Isle and Dudley were present at the ceremony at Malta on 3rd May when Her Majesty The Queen, accompanied by His Royal Highness The Duke of Edinburgh, unveiled the Imperial War Graves Commission's Memorial to 2,301 men of the Air Forces of the British Commonwealth and Empire who died during operations in the Central Mediterranean area and who have no known grave.

Also among those present were Air Chief Marshal Sir Francis J. Fogarty, K.B.E., C.B., D.F.C., A.F.C., and Lady Fogarty (Air Chief Marshal Fogarty represented the Chief of Air Staff); the Deputy Chief of the Air Staff, Air Chief Marshal Sir Ronald Ivelaw-Chapman, K.B.E., C.B., D.F.C., A.F.C., and Lady Ivelaw-Chapman; Marshal of the Royal Air Force Lord Newall, G.C.B., O.M., G.C.M.G., C.B.E., A.M., and Lady Newall; Marshal of the Royal Air Force Lord Tedder, G.C.B., D.C.L., LL.D., and Lady Tedder; Air Chief Marshal Sir A. Guy R. Garrod, G.B.E., K.C.B., M.C., D.F.C., LL.D.; Air Chief Marshal Sir Hugh P. Lloyd, K.C.B., K.B.E., M.C., D.F.C., LL.D., and Lady Lloyd; Air Chief Marshal Sir Robert M. Foster, K.C.B., C.B.E., D.F.C., and Lady Foster; Air Marshal Sir H. E. Philip Wigglesworth, K.B.E., C.B., D.S.C.; Air Vice-Marshal F. H. M. Maynard, C.B., A.F.C., and Mrs. Maynard; Air Vice-Marshal Sir John W. Cordingley, K.C.B., C.B.E., Controller, R.A.F. Benevolent Fund; Rev. Canon A. S. Giles, C.B.E., Q.H.C., Chaplain-in-Chief; and Rev. T. Madoc-Jones, O.B.E., B.A., Principal Chaplain (Presbyterian).

The Memorial at Malta is situated in a small garden just south of the King's Gate entrance to the walled town of Valetta, the site having been provided by the Government of Malta. The architect, Sir Hubert Worthington, O.B.E., A.R.A., has designed a column fifty feet high set on a circular base on which the names will be commemorated on bronze panels. The column, which is of travertine marble incised with a light reticulated pattern, is surmounted by a bronze gilded eagle seven feet nine inches high. The sculptor of the eagle, which was exhibited at the Royal Academy's Summer Exhibition, 1953, is Mr. Charles Wheeler, R.A. A bronze panel at the base of the column bears the following inscription:

> "Over these and neighbouring lands and seas the airmen whose names are recorded here fell in raid or sortie and have no known grave—Malta Gibraltar Mediterranean Adriatic Tunisia Sicily Italy Yugoslavia Austria —Proposit insula tenax tenaces viros commemorat"

The Latin inscription may be rendered: "An island resolute of purpose remembers resolute men." On each side of this dedicatory panel and around the base of the column are other bronze panels bearing the names of 2,301 Commonwealth airmen. The total is made up as follows:

> Royal Air Force (including two from Newfoundland), 1,545; Royal Canadian Air Force, 286; Royal Australian Air Force, 211; Royal New Zealand Air Force, 85; South African Air Force, 171; British Overseas Airways Corporation, 3.

THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

(NEWS ITEMS)

Jet Pilots Helped by Television Map

The Royal Air Force is installing a "television map" system at its traffic-control centres. The system has been especially designed to enable controllers to see at a glance the position of jet aircraft in distress.

The Royal Navy and Royal Netherlands Air Force are also installing this new equipment, and civil aviation authorities are interested as well. The system has been developed by Standard Telephones & Cables Ltd.

The system works in the following way. Radio signals from the aircraft which are picked up on an airfield direction-finding set and converted to bearings, are fed by landline to the control centre. Here, bearings from two or more of these stations in different parts of the country are shown on the television map, and the controller knows that the aircraft's position is at the intersection of the bearings. The controller can see at a glance where the aircraft is, and then direct it to an appropriate airfield.

Fire-fighting Discovery for Airfield Crashes

Airfield fire-fighting crews are to use a new British device which will revolutionize rescue work on planes which are forced to crash-land. A special chemical is used which, when sprayed on to a fire, puts it out in a matter of seconds, and drastically reduces the temperatures, so greatly improving the chances of saving people trapped in a red-hot wreckage.

The equipment has already been ordered by the United States Air Force in Europe, and after exhaustive tests it is now to be used by the Royal Air Force.

The chemical used is chlorobromomethane, generally known as C.B., and developed by General Fire Appliances Co. Ltd., of London. It is sprayed through hoses fitted with specially designed applicators, which control the droplet size.

Aircraft Labour Force Still Rising

The British Aircraft Industry's labour force now totals about 230,000. This figure, taken from the official statistics, covers firms manufacturing airframes, engines, undercarriages and propellors; it does not include employment in companies making parts and accessories for aircraft or work sub-contracted outside the main firms. The figure probably covers roughly two-thirds of the aircraft industry as a whole.

The labour force is now half as big again as it was in mid-1950 when employment began to rise. Since that time, about three and a half years ago, it has increased by about 80,000, or an average monthly intake of about 2,000.

The industry is still increasing at about the same rate—in January this year there was a net intake of 1,900.

NOTES FROM AMERICAN SOURCES

Long-range Applications of Rocket Power

Lieutenant-General D. L. Putt, U.S.A.F., Commander, Air Research and Development Command, in a recent address to the American Rocket Society, gave some interesting sidelights on the development of rockets for military purposes. He fully acknowledged the mass of valuable information in this sphere which came into our hands from German sources at the end of the Second World War, including the plans of Professor Hermann Oberth, the rocket expert, for a man-made space station for use in inter-planetary travel, in which the Third Reich saw possibilities of using this for military purposes to dominate the world, rather than for the professor's scientific or humanitarian aims.

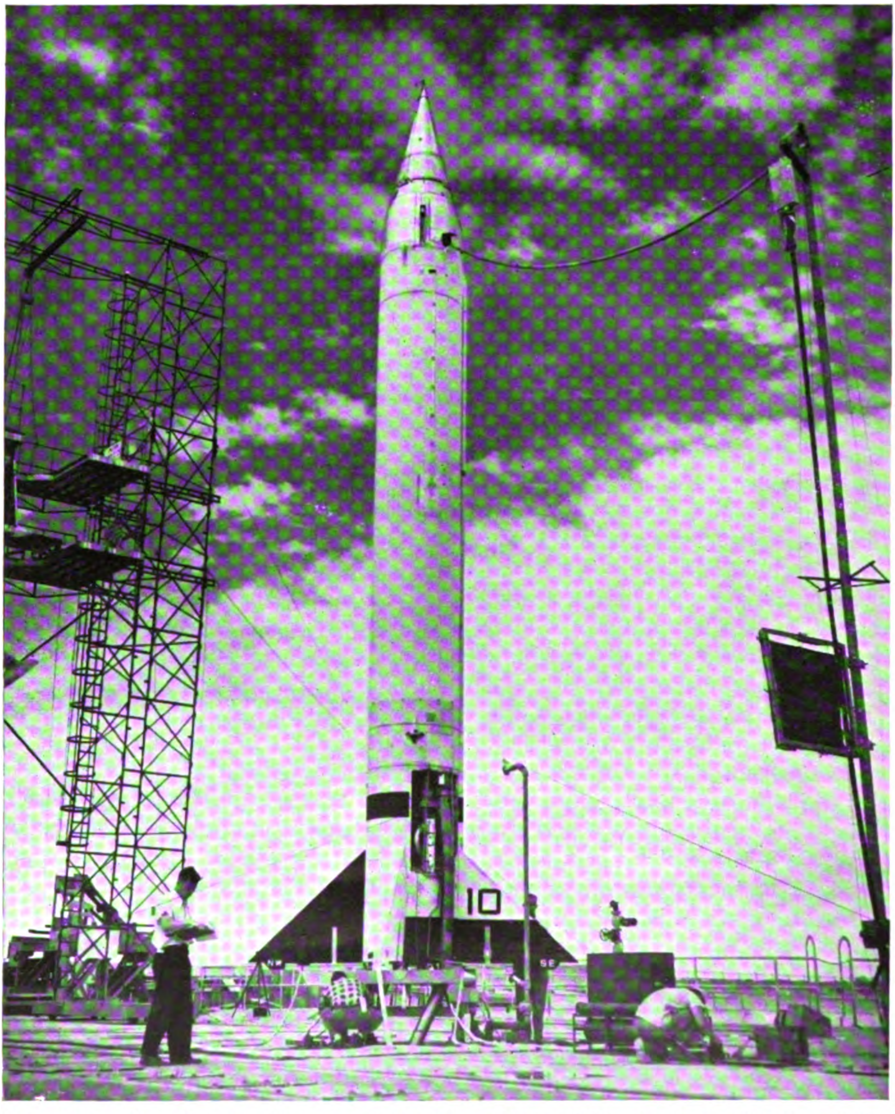
In regard to improvement in rockets since the end of the Second World War he said: "Generally speaking, improvements made in rockets and their application fall into four categories. One, we have improved rocket fuels, especially the liquid type, although not sufficiently to make an appreciable difference in our struggle for better fuel economy. Two, we have improved materials, both for the rocket power plants and the vehicles which they power, which will permit better performance, greater speeds and ranges. Three, we have improved the designs of both rocket power plants and vehicles, resulting in further gains. Four, and most important, we have made considerable improvements in the guidance and control of rockets and pilotless aircraft.

"The electronic components were undoubtedly the weakest link in the German guided missiles. Conversely, this is a field in which American engineers have always excelled. Therefore, the combination of German power plant and aerodynamic designs and of our own guidance and control developments have resulted in missiles whose over-all performance is a remarkable improvement over the German models. Further refinements, such as printed circuits and miniaturization, better gyroscopes and similar components, make the advances in guidance probably the biggest step forward in missile development since the end of the Second World War. . . ."

Summarizing what rocket power can do and is doing today, he said: "Progress made in rocket design has been such as to make it an increasingly useful weapon, both on the ground and in the air. For instance, an infantryman cannot practically fire a bullet much larger than .30 calibre from his shoulder, but he can fire a 3.5 in. rocket containing two pounds of high explosive—and he can do so with practically no recoil! Rockets of this calibre equipped with a shaped-charge warhead have effectively battled the biggest Russian-made tanks in Korea, and thus not only turned the menacing tide of tank warfare in the early part of the Korean campaign, but necessitated a complete re-evaluation of the tank as a tactical weapon in future wars.

"In the air, a conventional bullet of 1.5-in. diameter appears to be the limit of practicability for fighter aircraft, but rockets of 11¾-in. diameter and weighing over 1,000 lb. have been launched successfully and effectively. Using various principles of stabilization in flight, designed for high velocity, and equipped with powerful warheads and special-purpose fuzes, the aircraft rocket has become a strong competitor of the aircraft gun and cannon. It is significant in this respect that some of our latest airplanes, like the F-86D, carry only rockets for both offensive and defensive action."

Lieutenant-General Putt then gave examples of the developments in "rocketry" behind the Iron Curtain, accelerated tremendously by use of technical



Navy Viking No. 10 rocket being prepared for launching at White Sands Proving Ground, Las Cruces, N.M. The Viking was designed and built by The Glenn L. Martin Company for the Navy.

data captured from the Germans and assistance from German scientists. In conclusion he told his audience:

"Some of our present guided missiles could be put into mass production within a very short time if the need arose. There is, however, still much room for improvement, especially with respect to jam-proof guidance and control, fuel economy and over-all reliability. Undoubtedly, the future should bring much progress along these lines and, ultimately, provide us with missiles with tremendous speeds, uncanny accuracy, and with ranges to meet all foreseeable military requirements....

"Once this has come to pass, at some time still well in the future, I believe that the guided missile will gradually replace the bomber airplane! Similarly, guided rockets will take the place of anti-aircraft batteries on the ground and interceptors in the air because no human-operated mechanism will be able to cope with hostile missiles streaking down from the stratosphere at speeds several times those of sound. Radar-equipped robots will have to be devised to dispatch the anti-missile missiles into the air in order to intercept the enemy's robot bombers. And the military airplane, as we know it, will eventually be relegated to a mere logistical vehicle!

"Thus, perfection of the guided missile, jam-proof and equipped with warheads of unbelievably destructive power, will usher in a new era of warfare. No man, woman or child, no city, no farm, no animal will be beyond the reach of the aggressor's firepower, and even a brief war would destroy more people, more cities, and more land than have been destroyed in all previous wars combined. . . ."

* * *

Pondering on the developments of such devastating military weapons, we realize that the possession of them and the frightful threat of retaliation that they imply against an aggressor, is probably the greatest factor in preventing a third world war today.

Bows and Arrows in Modern War?

The following appeared in the Press recently under the heading "Darts as Weapons.":

"The U.S.A.F. yesterday made public details of a weapon (The Lazy Dog), a half-ounce steel dart, just over an inch and a half long. A shower of the darts dropped by a plane or exploded in a bomb had the same effect as a gigantic shot-gun charge, and could knock out non-armoured vehicles, a spokesman said."

This reminds us of one day in 1915 when from the ancient "Vickers-Gunbus" aircraft an experiment with similar darts, called "Flechettes," was carried out. A sackful of them was dropped on a target (which must remain unnamed to avoid repercussions); the result was that "the old so-and-so" continued to graze without even looking up, and afterwards was found to be unscathed. The experiments were discontinued.

Super Aircraft Carrier

A contract for the construction of the third of the new 60,000-ton *Forrestal-Class Carriers*, designed to handle the biggest Navy planes, has recently been awarded. The ship will cost about 182 million dollars.

PRIORITY OF AIRCRAFT OUTPUT

Another U.S.A.F. Martin B-57 light bomber leaves the final assembly line during the night, after the day-shift has been replaced by the night-shift to keep these bombers rolling off the assembly lines day AND night.

U.S.A.F. Aircraft Production

The setting sun brings no halt to the building up of America's aircraft strength. At the Glenn L. Martin Company's aircraft factory, with day and night shifts, work is continuous in rolling off the assembly lines the U.S.A.F. Martin B-57 light bombers. This is the first jet-powered aircraft designed and built specifically for night intruder missions, such as cutting enemy supply lines under cover of darkness. Powerful search radar makes possible the location of enemy targets under even the most adverse weather conditions. The B-57 is powered by two Wright Sapphire turbo-jet engines, each producing more than 7,200 lb. of thrust.

Aid to the Royal Air Force

The final details of a 252 million dollar American aid deal to help re-equip the Royal Air Force are being worked out by British and United States officials. Plans call for the aid to be spent over a period of three years in the form of off-shore procurements which will finance the production of war planes in British factories for the Royal Air Force.

Thailand—Emergency Preparations

Extensions and improvements to airfields in the north of Thailand are being rushed by the Government to meet any threat arising from the Vietminh rebel drive in Indo-China. Most of the airfields are of grass and are useless to bombers and fighters for part of the year.

Submarine Defence

By converting ten of the Second World War aircraft carriers of the 27,000-ton *Essex-Class Carrier*, the U.S. Navy is seeking to bolster its defences against the threat of the Soviets' growing submarine strength. These carriers will load "hunter-killer" groups charged with the task of clearing vital sea lanes of enemy submarines in the event of war. The conversion will give the Navy the ships necessary to handle its big new submarine-hunting planes and at the same time supply other vessels in "hunter-killer" groups for extended periods. The Soviets reportedly have 370 submarines in service or reserve and another 100 under construction.

High-speed Sleds

United States Air Force volunteers are preparing to ride the world's fastest land passenger vehicle—a 750-mile-per-hour rocket sled—in order to develop equipment enabling air crews to survive bail-outs from airplanes travelling faster than the speed of sound, it was announced by the Air Research and Development Command here today.

The initial tests, now using dummies, to be followed by human volunteers, are being run at comparatively slower speeds with the supersonic speed ranges being the objective in later test runs.

The experiments will be conducted on a 3,500-foot railroad track at the Holloman Air Development Center at Alamogordo, New Mexico, by scientists of the Air Research and Development Command with equipment designed and built by Northop Aircraft, Inc., of Hawthorne, Calif.

The subjects who ride the sled will travel far faster than man has ever before moved on the ground, and they will be strapped in a chair that will rotate them head over heels 180 times per minute, exposing them to the same air blast forces that would be experienced by a pilot ejected suddenly from a supersonic airplane.

[R.A.A.F. Official Photo

The Australian equivalent of the Air Council is Air Board. Photo shows late C.A.S., Air MarshalJ. D. I. Hardman, C.B., O.B.E., D.F.C., at his first board at which he took over from Air Marshal G. Jones, C.B., C.B.E., D.F.C. From left, Finance Member, Mr. J. N. A. Andrews; Air Member for Personnel, Air Vice-Marshal F. M. Bladin, C.B., C.B.E.; Air Member for Supply and Equipment, Air Vice-Marshal J. E. Hewitt, C.B.E.; Air Marshal Jones; Air Marshal Hardman; Secretary, Air Board, Mr. F. Mulrooney; Secretary, Dept. of Air (ex officio), Mr. E. W. Hicks; Air Member for Technical Services, Air Vice-Marshal E. C. Wackett, C.B.E.; Citizen Air Force Member, Group Captain J. L. Waddy.

ROYAL AUSTRALIAN AIR FORCE

AUSTRALIA–THE AIR POWER PROBLEM

SINCE the arrival of Air Marshal Sir Donald Hardman, K.C.B., O.B.E., D.F.C., R.A.F., in Australia in January, 1952, as Chief of Air Staff of the Royal Australian Air Force, the doctrine of air power has at last taken root in the Commonwealth. When Sir Donald left in January, 1954, he could take some pride in the assurance that he had accomplished a miracle in Australia.

Air power has until now been a dream of a few men in Australia. The bulk of Australian politicians and other national leaders, as well as the majority of ex-Service men (who are more of a political power in the Commonwealth than most Australians will admit) have pinned their faith on bayonets and ships. Australian military tradition rests upon Gallipoli and Villers Bretonneux, upon Bardia, Greece, Syria, and New Guinea. In Australian history the great step in the march to nationalism was Gallipoli. The citizen force military tradition of a lean, hard troop fighting with a bayonet is deeply embedded in the Australian consciousness. There is no tradition or liking for regular and highly trained professionals.

In the last war, Australia was saved from invasion and the Japanese defeated largely through the United States Navy's battles in the Central Pacific. The Royal Australian Navy has inherited, from the public standpoint, the good will created in Australia by the achievements of the U.S. Navy in the Pacific. The fact that this glory was the result of seaborne air power has been lost on the Australian public, but the politicians were deeply impressed. During his term as Chief of Naval Staff, R.A.N., Admiral Sir Louis Hamilton, R.N., sold the Australian Labour Government the idea that the R.A.N. must have aeroplanes, even if this meant only one light carrier. The R.A.A.F. did not press home the proposition that it should operate the R.A.N.'s aircraft on the carrier—Mustangs could have been adapted for carrier work and would have been superior to the Fireflies, etc.

When Mr. Menzies returned from Britain in 1951 with the message to build up Australia's defences to cope with the threat of a cold war that was heating from Korea and Indo-China and Malaya, the three Services began to share an annual income of roughly £A200,000,000. (About £150,000,000 sterling.) Of this the Army took the largest share—£A75,000,000 on the rough average—and the Navy and R.A.A.F. roughly £A50,000,000 each.

Nobody had the courage to come out and challenge the Government's policy of three Services trying to provide adequate land, sea and air defences. Yet it was obvious that for £A200,000,000 nobody could expect to get three potent Services. The introduction of National Service Training was a further drain. This was born through the failure of the Army to attract recruits for the Commonwealth Military Forces—the Australian version of the Territorials. The Army was saved by National Service. However, the political compromise forced upon the Menzies Government by the deeply rooted Labour objections to compulsory military training (which, curiously enough had been introduced into Australia forty years before by the Fisher Labour Government in time for the First World War) cut the entire value of National Service Training. In Australia National Service men are not available for service outside Australia (even in New Guinea) and the period is six months. The R.A.A.F. trainees do their entire training in one period of 174 days, but the Army trainees have a brief training period of three months before going into the Commonwealth Military Forces units in which they do a certain number of evening training periods and annual camps.

Australia's entire defence organization is unbalanced today and the first public figure to say so and give a reasoned explanation why (in print) was Sir Donald Hardman in an interview with the Australian aviation journal *Aircraft* on his departure for England. In attempting to provide a "balanced" defence, the Government had failed, was the message left by Sir Donald.

Australia's one defence need today was for a strong R.A.A.F., highly mobile and strongly equipped. First, the R.A.A.F. vote of £A55,000,000 this year should be increased to at least £A70,000,000. Personnel should be increased from the present 16,500 to some 22,000—which was actually the target figure laid down in 1951 under the emergency plans, but hacked down in 1953 under the "there won't be a war" policy which was occasioned by the Korean truce.

"In my view," said Sir Donald, "the present defence set-up in Australia is out of balance. In the present strategic look of the world—with the risk of global war receded—but the cold war going on—the forces you want are highly trained, mobile, regular forces: forces which can go anywhere they are needed at almost a moment's notice. The Air Force offers just the sort of force Australia wants with which to meet the situation with which you are now confronted.

"The Navy . . . well, the Navy can claim to be a permanent force, with specialist training and some degree of mobility.

"The Army is the nigger in the woodpile. The Army costs a tremendous amount of money, training people who are of little real use to Australia in a cold war—they can't be sent out of Australia except as volunteers—and of no immediate use in a hot war because they have to be trained all over again. They quickly forget their three months' training as National Service men, and only fully trained men are any use in ground fighting in a modern war.

"I am not opposed to National Service Training: it is a great thing for national morale and it has been a great success in Australia. But it is a pity the cost comes out of the Defence Budget . . . .

"Australia is not likely to be attacked at any time in the near future, but if it were to be attacked the Air Force is the only force which can effectively prevent a hostile fleet from getting here, either by attacking it in harbour or by destroying it by bombing on its passage here."

Among Sir Donald's points were:

. . . . Australia has forgotten that there is not one possible hostile Pacific naval power. Our main need is for an air task force.

. . . . Neptunes can do any job the R.A.N. can do, and better.

This interview created a stir in defence and political circles. For two years, Sir Donald had been selling air-power doctrine, even buying copies of Seversky for prominent Australians who thought it had something to do with Disney. He had to fight the Gallipoli-Nelson attitude to defence, starting at first premises.

The Army today is a small permanent nucleus comprising a training cadre for the C.M.F., together with a Brigade Group of Regulars. The Korea force was raised by calling for and training volunteers by single infantry battalions on a short-service enlistment basis.

The R.A.N. is a two-carrier force with cruisers and destroyers entirely devoted to the onerous task of protecting those carriers against submarines.

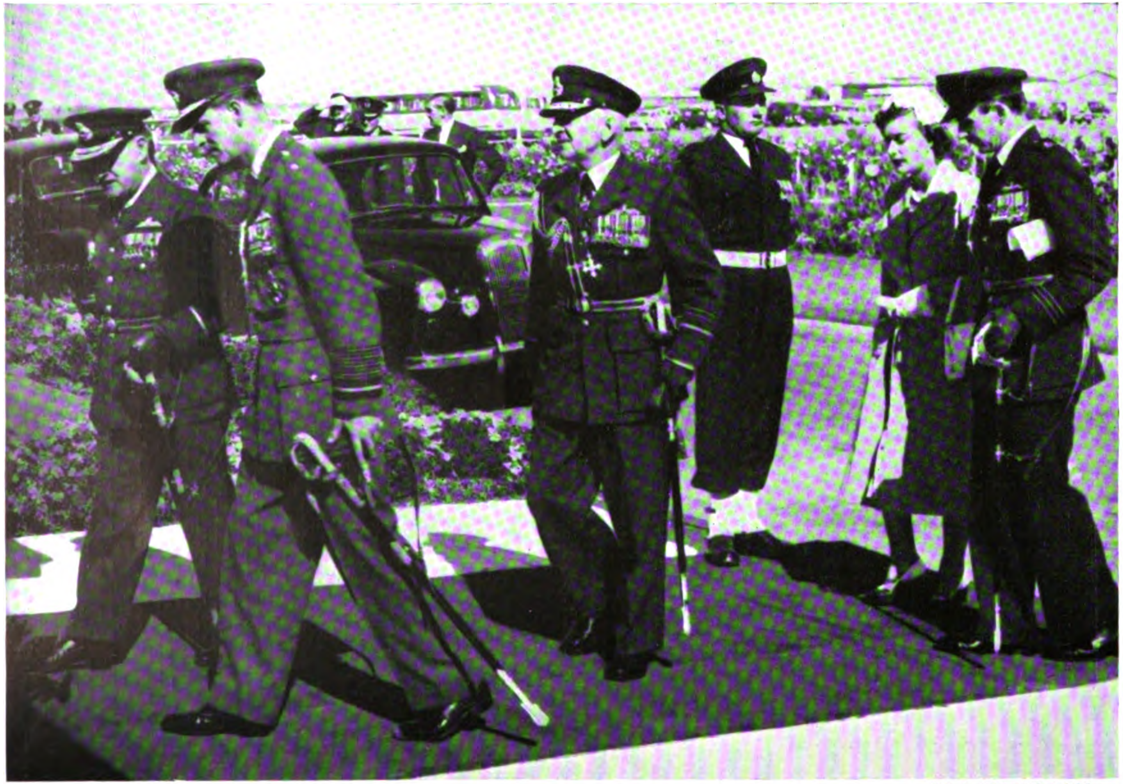
With only £A200,000,000 to spend, it seems obvious that Australia should devote these funds to one main force, with a smaller Army and Navy. Out of that £A200,000,000 comes the Defence Production allocation of funds. Out of the R.A.A.F.'s money comes the entire income of the Australian aircraft industry—the R.A.A.F. is practically the only buyer, for the R.A.N. orders are negligible by comparison. As the small orders for Australian Canberras, Sabres and Avon engines push the cost of these aircraft to double the import price, the R.A.A.F. is doubly hampered. The R.A.A.F. argues aircraft should not be purchased out of the R.A.A.F.'s annual income, but it does fight continually to keep the Australian industry going. The R.A.A.F. would have grounded from 1940-44 if Australia had not produced its own aircraft. The R.A.A.F. was denied modern aircraft both by Britain and America by a United Kingdom-United States of America agreement which allowed "allies" only obsolete types such as Vultee Vengeances. The R.A.A.F. in the Pacific war learned its lesson; Australia will keep its aircraft industry going no matter at what cost.

However, if the R.A.A.F. is to be increased at the expense of the Army and perhaps the Royal Australian Navy, it should be given punch with a medium-bomber force. Sir Donald Hardman suggested that one of the "V" types would be ideal, but he believed also that these could not be made in Australia because of the great cost per aircraft owing to the small order that would be given. This question will undoubtedly arise soon when the problem of Canberra replacement arises.

Any increase of R.A.A.F. manpower, such as Sir Donald suggested, to 22,000 from 16,500, would not add units to the R.A.A.F. Of the three squadrons of the R.A.A.F.'s single fighter wing, only No. 77, in Korea, is at full strength. The two in Malta, Nos. 75 and 76, have only eight aircraft each. The Lincoln unit in Malaya (No. 1 Bomber Squadron), also has only eight aircraft, while the Citizen Air Force ("week-end") squadrons—on which Australia's home defence is based—are only six to eight aircraft strong. If the R.A.A.F.'s annual vote were increased to £A70,000,000 under present conditions no units would be formed. Existing units would be brought up to establishment strength and that was all.

There has been a considerable swing in public opinion in favour of the Air Force, and Sir Donald Hardman had a great part in this. He brought prestige to the post of C.A.S., in the Prime Minister's own words, and was a great figure during his two years here. Australia's problem has been that while Britain had the lesson of air power pushed down her throat in 1940-45, Australia was never saved by air power close to home. The potent air forces fighting near Australia were, unfortunately for today, carrier borne. The average man has forgotten the U.S.A.A.F.-R.A.A.F. battles for air domination in the MacArthur campaigns in the south-west Pacific area, for these were undoubtedly secondary to the U.S.N. shows.

Australia now is learning the facts of air power. The impact of atom-bomb war has brought this change of mind, sharpened by the continued battle of Air Marshal Hardman in high places. There can be no question today that Australia is well on the way to taking the decision which Churchill made in the past few years—that air power is the dominant weapon.



[R.A.A.F. Official Photo

Arriving at Point Cook the Duke of Edinburgh is shown with, left: Air Vice-Marshal A. M. Murdoch, C.B., C.B.E., Air Officer Commanding, Training Command; Centre is Chief of the Air Staff, Air Marshal J. P. J. McCauley, C.B., C.B.E.; and on the right, Lady Pamela Mountbatten; and Wing Commander M. Cowan, D.S.O., Royal Equerry.

CURRENT EVENTS (R.A.A.F.)

R.A.A.F.'s Part in Royal Tour

THE Royal Australian Air Force played a most prominent part in the ceremonies connected with the Royal Tour of Australia.

The R.A.A.F. first saluted the Queen on 1st February, when three Lincoln bombers from No. 82 Wing at Amberley, Queensland, flew out into the Tasman to meet the *Gothic*. When the *Gothic* entered Sydney Heads on 3rd February, R.A.A.F. aircraft again saluted Her Majesty, and Vampire jet fighters flew overhead as the Queen stepped ashore on Australian soil at Farm Cove.

On the Queen's second day in Australia the R.A.A.F. provided the guard of honour and the band for the opening of the New South Wales Parliament. The Guard's precision and bearing attracted much comment that day.

The Queen saw the R.A.A.F. in a different role when she travelled by a marine craft from the B.H.P. steel works at Newcastle to Stockton on 9th February. That is the only "voyage" she will make in a R.A.A.F. boat, but the big 63-footers which the R.A.A.F. has just taken over this year have been providing air-sea rescue cover during the royal party's flights across water.

A most important aspect of the R.A.A.F.'s part in the Royal tour was, of course, the actual flights made by the Queen in R.A.A.F. aircraft. Seven Dakotas formed the Royal Flight. One Dakota was the Queen's personal aircraft.

On 12th February, the royal party flew from Mascot to Bathurst. On the following day the royal party flew from Mascot to Wagga and on to Canberra, returning from Canberra to Mascot on the 18th.

The royal aircraft itself was captained by Squadron Leader J. G. Cornish, A.F.C., whose crew comprised Squadron Leader C. W. Brackenridge, navigator, Flight Lieutenant T. C. McGrath, signaller, Pilot Officer J. R. Newson, co-pilot, and Sister G. E. Bury, hostess.

The Queen flew 5,000 miles in this R.A.A.F. Dakota during her Australian tour. The R.A.A.F. actually flew the Queen on most of her flights, the remainder being done by the civil airlines.

When the Queen left Sydney in the *Gothic* for Hobart, R.A.A.F. Vampires and Mustangs flew overhead in salute. When the *Gothic* approached the Derwent on Saturday morning, 20th February, three Lincolns from East Sale appeared overhead and remained until the ship berthed at Hobart.

One of the most spectacular Service occasions was the great parade by the three Services at Canberra on 15th February. Unfortunately, the weather was bad. The R.A.A.F.-R.A.N. fly past by nearly 100 R.A.A.F. aircraft and fifteen R.A.N. aircraft was cancelled. The fly past was postponed until the Queen's visit to Duntroon, when an impressive display was given overhead.

When the Queen arrived in Melbourne by air, on 24th February, a R.A.A.F. guard of honour and band were at Essendon. Thousands of R.A.A.F., W.R.A.A.F. and A.T.C. cadets too, lined the streets during the royal progress through Melbourne streets to Government House.

The greatest occasion, from the R.A.A.F.'s point of view, was the royal visit to Point Cook on the afternoon of 6th March. More than 800 R.A.A.F. and W.R.A.A.F. paraded, and all R.A.A.F. and W.R.A.A.F. members in the Metropolitan area were there to watch—except those on important duty—with wives and families. This was the R.A.A.F.'s day.

The Avon-Sabre jet fighter prototype was among the aircraft inspected by the Queen and His Royal Highness the Duke of Edinburgh in the static display at Point Cook.

[*National Defence Photo*

ON KOREAN AIR-LIFT

Corporal Dennis B. Guile, of Winnipeg, Man., an aero engine technician with the R.C.A.F.'s 426 Thunderbird Squadron on the Korean airlift, is shown repairing the oil filters on a North Star Rolls-Royce Merlin engine at Haneda Air Base near Tokyo.

ROYAL CANADIAN AIR FORCE

AIR TRANSPORT COMMAND

By Flight Lieutenant H. C. Langille

[National Defence Photo

Air Commodore R. C. Ripley, Air Officer Commanding, Air Transport Command, Lachine, P.Q.

In modern warfare no operation can be a success without the fastest possible movement of men and materials. The Germans proved this by their air support of the assault on Crete in 1941. Later, the Allies achieved notable success in South-East Asia and again in North-West Europe at the time of the Normandy landings and the crossings of the Rhine; and a few years after that, the Berlin air-lift, a full-scale air transport operation, won a signal victory for the West in the "cold war." More recently still, air transport has been a vital factor in supporting the conduct of the war in Korea.

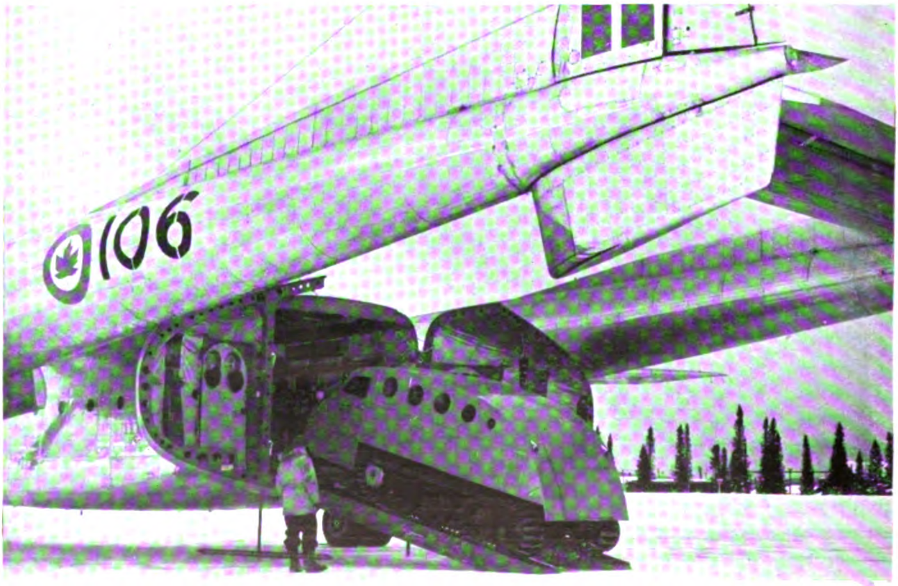
The R.C.A.F. planners have used these valuable lessons of the Second World War in their development of Air Transport Command. With headquarters at Lachine, A.T.C. now controls five squadrons. Aircraft of these squadrons make frequent appearances in far corners of the globe as well as in many of the major cities in North America and Europe. They carry Service personnel and material to Tokyo, London, and all parts of Canada, on regular schedules. Their operations in Canada extend from Goose Bay to Vancouver, from Dorval through Winnipeg to various far-northern outposts, of which Resolute Bay is only one.

Aircraft of A.T.C. range from the well-known Beechcraft, capable of carrying four to five passengers, to the Dakota, the C-119, and the North Star. Since the start of the Second World War, Air Transport Command has progressed from a branch of A.F.H.Q. to a vital arm of our present-day Air Force.

From those transport squadrons built up during the Second World War, the diminishing requirements for the immediate post-war era left only No. 164 (Transport) and 12 (Communications) Squadrons still active. No. 164 was based at Dartmouth, with a detachment at Edmonton; while No. 12 remained at Rockcliffe. In the late summer of 1946, No. 164 was renamed and became

[National Defence Photo

Unloading Weasel out of North Star at Isaachsen, Ellef Ringnes Island, N.W.T.



[National Defence Photo

FLYING "PACK-HORSE"

Acting as the "pack-horse" of the R.C.A.F., a C-119 or "Flying Boxcar" lands at Goose Bay, Labrador, with a cargo of freight including a snowmobile, which, if not as romantic as a dog-team, performs the same functions with more power and endurance. Designed to carry bulky loads, the C-119 has a still-air range of around 1,500 miles, and as a troop transport can carry 64 fully-equipped paratroopers.

426 (T.) Squadron, while its detachment at Edmonton became No. 435. At the same time, No. 12 Squadron was renamed No. 412 (T.) Squadron. In 1947, No. 426 moved to Dorval and set up domestic facilities at Station Lachine. Late in 1947, it began to convert from Dakotas to North Stars. All the above units then came under the control of No. 9 (Transport) Group, which had been formed to take over the expanded responsibilities of the Directorate of Air Transport.

On 1st April, 1948, No. 9 (T.) Group was expanded into our present Air Transport Command, with headquarters then located at R.C.A.F. Station, Rockcliffe. In addition to air transport operations, A.T.C. also assumed control of aerial photographic operations.

Its headquarters remained at Rockcliffe until August, 1951, when it was moved to its present location at R.C.A.F. Lachine.

THE SQUADRONS

No. 426 (T.) Squadron

As stated earlier, No. 426 Squadron was formed out of No. 164 in the late summer of 1946. In March of 1947, equipped with Dakotas, it moved to Dorval. Its routes were confined mainly to Eastern Canada. Later in the same year, however, it began to convert to North Stars, thus materially increasing its range. By the end of 1948 it was flying trans-Canada trips from Dorval to Whitehorse, in addition to its regular commitments in Eastern Canada; and since the spring of 1950 it has regularly participated in the seasonal re-supply of arctic weather stations and has maintained regular service between Dorval and Resolute Bay.

By the summer of 1949 the probable future demands on No. 426 Squadron were under consideration. In anticipation, extensive training trips were approved, and the squadron embarked on a training programme consisting of flights to Europe and through the Middle East, returning via South America to the home base at Lachine. These training trips proved invaluable, and the crews gained experience which later enabled the squadron to step in on very short notice and undertake the trans-Pacific air-lift at the outbreak of the Korean war, during which it succeeded in building up a very enviable record.

In July, 1950, the squadron was seconded to the Military Air Transport Service (M.A.T.S.) of the U.S.A.F., and transferred its operations from Dorval to McChord Field, Tacoma, Washington. It was from this base that the squadron participated in the first year of the Korean air-lift, beginning its operations by flying one trip each day across the Pacific. Though it has long since been returned to Dorval, it continues its trans-Pacific flights. Since the start of the Pacific air-lift, this squadron has carried out more than 500 round trips and has air-lifted over six million pounds of freight between Tacoma and Tokyo.

In addition, No. 426 presently operates a scheduled return flight from Montreal, via Winnipeg and Edmonton, to Vancouver, every four days.

Now that the R.C.A.F. has its four fighter wings in Europe, logistic support is provided by trans-Atlantic flights from Dorval to the United Kingdom. While routine return runs are on a twice-weekly basis from Montreal to North Luffenham, No. 426 Squadron has, on more than one occasion, made as many as twenty-five trans-Atlantic crossings per month.

No. 435 (T.) Squadron

After disbandment, No. 435 was reactivated in August, 1946, from the original detachment of No. 164 Squadron. Its main commitments were air transport flights in support of the North-West Staging Route, but it also operated transport flights from Edmonton, through Winnipeg, to Churchill, Baker Lake, Coral Harbour, and other locations in western and north-western Canada. In 1948 it took over the U.S.A.F.'s function in Operation "Beetle" and thus became involved in long freight hauls from Edmonton to such sites as Norman Wells, Kittigazuit, Sawmill Bay, and Cambridge Bay.

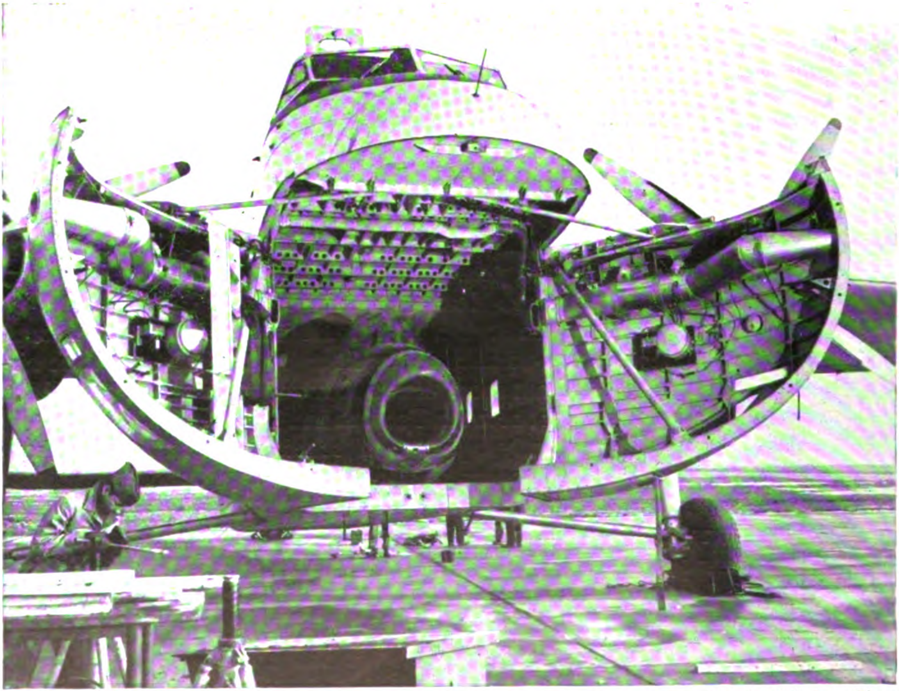
As well as its multiple other domestic tasks, air evacuation was assigned to No. 435 in 1951. Its Dakotas picked up wounded Korean veterans who had been flown in by M.A.T.S. to McChord Field, and flew them to D.V.A. hospitals across Canada. Late in 1952, the squadron converted from Dakotas to the new C-119. This aircraft, much larger than the Dakota, has substantially increased No. 435's air transport potential.

The squadron regularly engages in paratroop continuation training for Western Command units, and it participates in combined manœuvres and the air-dropping of supplies to many remote detachments.

No. 412 (T.) Squadron

The oldest squadron in A.T.C. is No. 412 (T.) Squadron. Originally No. 12 (Communications) Flight, it received its present designation in August of 1946. Known as a personnel carrier squadron, it has always been based at Rockcliffe. Its main function is personnel communications work for National Defence Headquarters, Air Materiel Command, and other D.N.D. components in the Ottawa area. Its flights regularly embrace the whole of Canada and the United States.

Its prime function, and one in which it takes great pride, is its regular transportation of V.I.Ps. High-ranking visiting dignitaries, from practically every



[National Defence Photo

Loading Sabre Fuselage into Bristol Freighter. With the fuselage in position and ready for tying down, the nose can be seen in the doorway of the Bristol Freighter as the giant doors close in preparation for flight from 30 Air Materiel Base, Langar, to Grostenquin, France.

country in the world, are brought to, and take away from, Ottawa by No. 412's aircraft. In addition to its six Dakotas, the squadron has two North Stars specially fitted for passengers, and the now well-known Canadair C-5.

No. 412 carried out the first complete round-the-world flight made by the R.C.A.F., when the Hon. L. B. Pearson made his global trip early in 1950. In 1951, the C-5 of this unit carried Princess Elizabeth and the Duke of Edinburgh on their tour of Canada. It regularly carries officers attending R.C.A.F. Staff College, National Defence College, and the Imperial Defence College, on their various tours in North America and to and from the United Kingdom. Last year the squadron flew the Hon. C. D. Howe and the Canadian Trade Commission on an extensive tour of South and Central America.

In addition to its personnel carrier role, No. 412 has in the past several years been responsible for paratroop continuation training for the Royal 22nd Regiment and the R.C.Rs. in Eastern Canada.

The most recent additions to this unit are the two Comet jet airliners recently acquired by the R.C.A.F. and intended primarily for use in co-operation with Air Defence Command. Both aircrews and groundcrews took extensive training in the United Kingdom on the operation and maintenance of these aircraft.

No. 436 (T.) Squadron

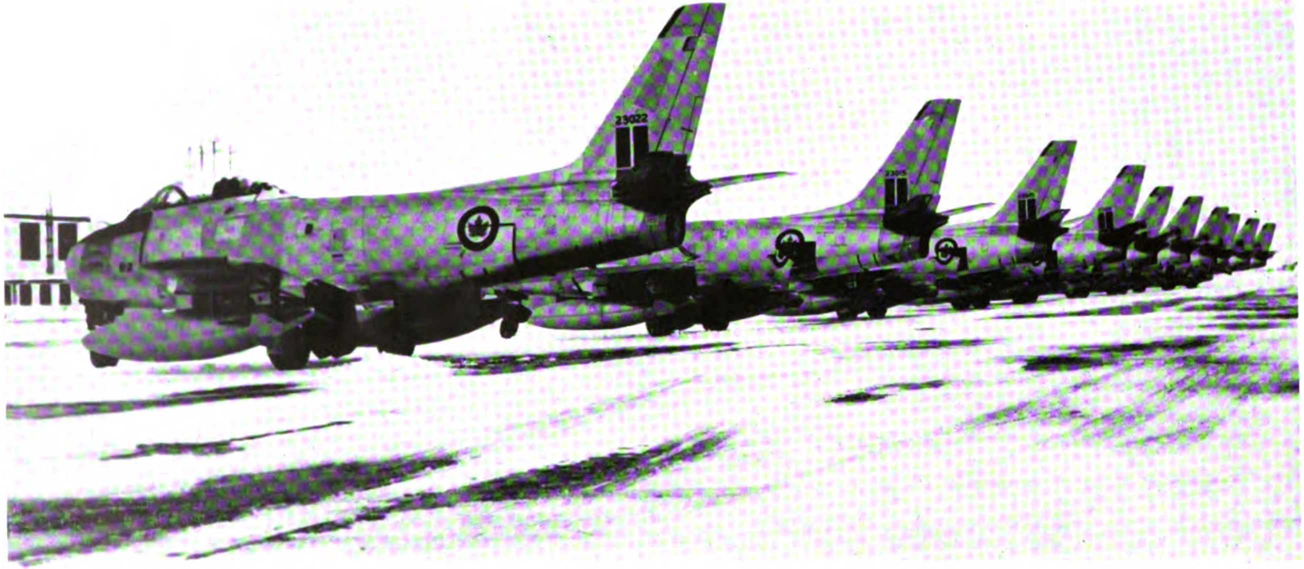
This famous squadron, disbanded at the end of the Second World War, was reactivated in 1953 in Montreal, and has already reached its unit establishment of C-119's. The squadron badge shows the head of an Indian elephant, and its motto is "We Carry the Load."

Equipped with large-capacity C-119's, the squadron will be responsible for the major air transport domestic requirements in Eastern Canada. It will undertake all paratroop continuation training formerly done by No. 412, and it will also, very probably, carry out much of the regular routine transport between Dorval and the Goose Bay area, as well as a large proportion of the arctic re-supply work. Further, it will provide the support for combined army operations in Eastern Canada. It is predicted that in a year's time the name of No. 436 Squadron will be as well known across Canada as that of any of its older sister squadrons.

CONCLUSION

The road to our present A.T.C. has been long and often frustrating. The thought and work of a great many men have gone into its organization, but the net result has more than justified their labours. It is no small achievement, in an air force of the size of the R.C.A.F., to have reached the stage at which we can point, without fear of contradiction, to the watchwords of our Air Transport Command:

"Anything—Anywhere—Anytime—Safely."



[National Defence Photo

MORE POWER FOR N.A.T.O.

New Canadian built Sabre jet fighters powered by Canadian built Orenda engines are taking their place on aerodromes of the R.C.A.F. overseas. Here is a line-up of the new Mark 5 jets; the most powerful now in Europe. The R.C.A.F. has 12 Sabre squadrons flying for N.A.T.O. at bases in England, France and Germany.

R.C.A.F. CURRENT EVENTS

[National Defence Photo

5th ANNIVERSARY OF N.A.T.O.

Here fourteen representatives are shown before the member nations flags from Italy, France, the Netherlands, Norway, Portugal, Turkey, Belgium, Denmark and Great Britain. Left to right they are: Lieutenant J. M. C. Patacho, of Portugal; Sergeant K. A. Gundrosen, of Norway; Chief Corporal J. Perino, of France; Chief Corporal E. L. Burin des Rozier, of France; Flight Cadet T. W. Munday, of Canada; Flight Cadet F. Lisgo, of Canada; 1st Lieutenant J. H. R. Geerdesof, of the Netherlands; Captain F. Hermans, of the Netherlands; 2nd Lieutenant B. Thomas, of Belgium; 2nd Lieutenant T. A Naets, of Belgium; Flight Cadet J. Madsen, of Denmark; Lieutenant O. Johansen, of Norway; Flight Cadet P. Jorgensen, of Denmark; and Lieutenant A. M. T. Brito, of Portugal.

Fifth Anniversary of N.A.T.O.

IN nine N.A.T.O. nations across the European continent, more than 2,700 aircrew are now flying their aircraft Canadian style—graduates of the R.C.A.F.'s N.A.T.O. air-training programme.

The signing of the North Atlantic Treaty at Washington just five years ago on 4th April, 1949, was the outcome of a desire by a group of nations to solve their mutual security problems. Out of the treaty came the Defence Committee, made up of members of all the signatory nations with the one common idea, "separately and jointly by means of continuous and effective self-help and mutual aid, to maintain and develop their individual and collective capacity to resist armed attack."

At the first meeting of the Committee in Paris in November, 1949, a Canadian offer to Army officers and aircrew for the forces of the other N.A.T.O. countries was well received. Arrangements were worked out under which these Army officers and aircrew from Belgium, France, Italy, the Netherlands, and the United Kingdom, would be trained in Canada.

Since the arrival of the first group and their subsequent graduation in June, 1950, many changes have taken place. As we approach the fifth anniversary of N.A.T.O. the number of participating nations has grown from the original six to a total of nine, with the addition of Portugal, Denmark and Turkey.

More than a thousand pilots and 1,700 navigators have already received their coveted wings at flying schools throughout Canada, and another 900 are now in various phases of training.

The original offer was for Canada to provide training for approximately 1,400 aircrew per annum. Canada was to provide, in addition to the cost of training, all food, accommodation, transportation within Canada, and hospital and dental care. The R.C.A.F., with the experience gathered during the Second World War in running the huge British Commonwealth Air Training Plan, in which 131,000 highly trained aircrew were produced, including aircrew from Australia, New Zealand and Britain, found little difficulty in adjusting to the new job.

On arrival in Canada, the students go first to a pre-flight orientation course at London, Ont., where they receive language instruction, lessons in Canadian customs and geography, as well as other information to ease their introduction to a strange land and R.C.A.F. training techniques. After this initial three-week course, with language training provided if desired, they move on to flying training schools, with the pilots going to schools at Centralia, Ont., Claresholm, Alta., Penhold, Alta., and Moose Jaw, Sask. The navigators receive their training at Winnipeg, Man.

Advanced flying schools are maintained at Gimli, Man., Portage la Prairie, Man., and Saskatoon, Sask., and a Pilots' Weapons School is located at MacDonald, Man. While the initial flying is given on Harvard aircraft at the flying training schools, the more modern T-33 Canadian-built Silver Stars and the Mitchell B-25 twin-engine light bombers are used at the advanced schools. Those students training to be fighter pilots go to the T-33 jet schools, while those destined for transport or maritime operations receive their advanced training on the Mitchells.

Understanding and tolerance on the part of instructors and students alike have paved the way past the obstacles of language, rank and custom differences. From the outset a genuine N.A.T.O. spirit has been developed by promoting understanding and a sense of solidarity among the various national groups. The growth of the team spirit is fostered in many ways. Inter-flight sports and after-duty social activity problem has been the mixing of nationalities within the flights and also in the sleeping quarters. This dispersal is continued at flight school and serves to offset the natural tendency of the individual to seek companionship in his own national group.

Among the sports, soccer has undoubtedly been the chief common denominator linking the various groups together. Their love of the game is inveterate and all-embracing, and their clean, skilful play is a treat to watch. It is interesting to note that a cheering section at any game is liable to be comprised of eight languages.

The fifth anniversary of N.A.T.O. finds Canada's Air Division overseas fully operational and in the process of re-equipping with the latest mark F-86 Sabre jets.

Last year, in Operation "Leap Frog IV," the last three Sabre squadrons flew the Atlantic to complete the twelve-squadron team of the Air Division.

Now Mark V Sabres, with Canadian-built Orenda engines, are being ferried across to the four stations to increase the effectiveness of these fighter squadrons. Orenda engines give the Sabres 1,500 pounds more thrust, enabling them to climb and fly faster with an increased ceiling. The first of these new aircraft arrived at No. 4 Wing at Baden-Soellingen, Germany, in February.

Perhaps the most welcome announcement of the past year was the decision of the Government to allow Service men to bring their wives and families to Europe at public expense. Not only did this improve morale, but it meant that personnel going to Europe could be employed there for longer periods of time without undue hardship, thus eliminating the rapid turn-over of trained technicians and assuring the R.C.A.F. of peak efficiency over longer periods.

More than 4,000 R.C.A.F. personnel are working with the Air Division which includes the following bases: The Headquarters at Metz, France; four fighter wings at Grostenquin, France, Baden-Soellingen and Zweibrucken in Germany; and North Luffenham in England. An air material base is located at Langar, England, for supply and logistics support and is linked to the Continental bases by Bristol freighter aircraft.

In the operational field, participation in aerial exercises occupies a large portion of the flying time and also binds the R.C.A.F. close to the five sister nations in the Allied Air Forces, Central Europe. Training is a continual process and recently established was the Instrument Rating Flight at Zweibrucken. Here T-33 Silver Stars are used to improve the pilots' proficiency in blind flying techniques.

Under command of Air Vice-Marshal Hugh L. Campbell, the Air Division is linked with French and American tactical air forces to form the Fourth Allied Tactical Air Force (4 A.T.A.F.). The tactical air forces of other allied powers are similarly integrated and these numbered A.T.A.Fs. are brought together in a tactical air team, the A.A.F.C.E. organization.

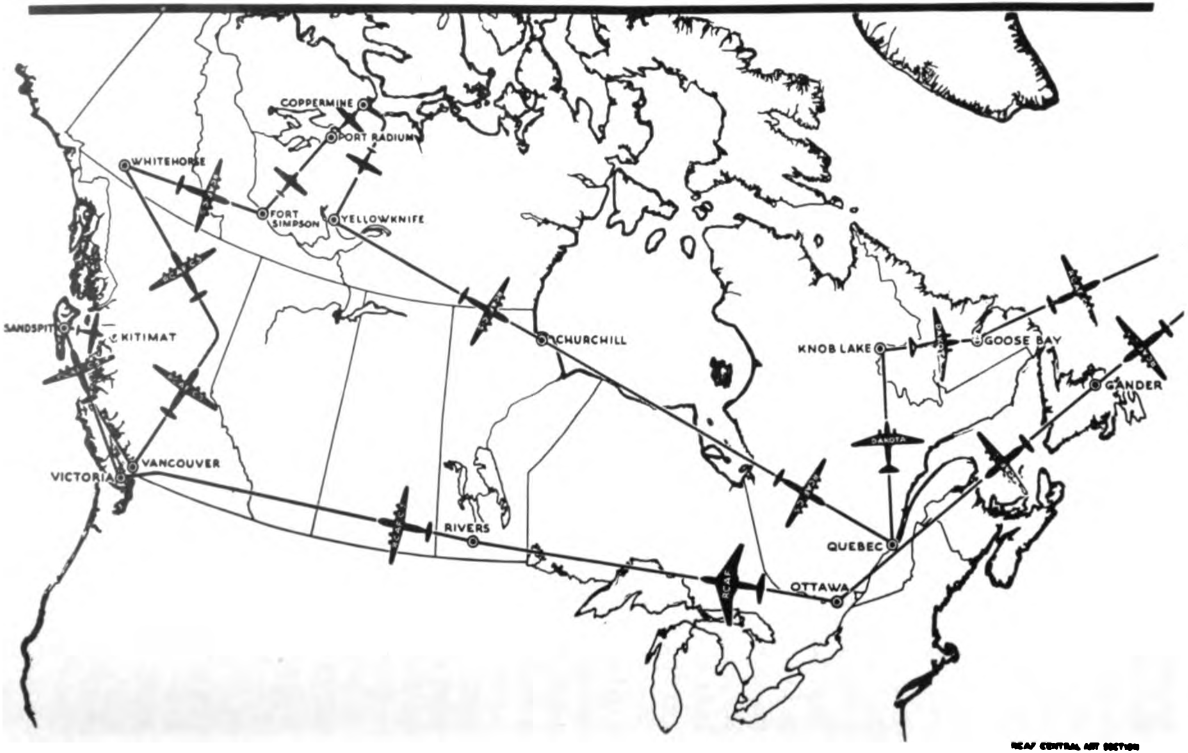
Beginning with the North Atlantic Treaty signed at Washington on 4th April, 1949, the R.C.A.F. has covered the distance to full operational strength with rapid strides. Manned by well-trained pilots and supported on the ground by the R.C.A.F.'s finest technicians, the twelve Sabre squadrons are ready to do battle with any intruder that may threaten the peace in Europe.

H.R.H. The Duke of Edinburgh to Visit Canada

His Royal Highness will be flown over from London, England, on 28th July, in the R.C.A.F. C-5 transport that recently flew Prime Minister St. Laurent on his world flight. In Canada, His Royal Highness will do all point-to-point travel by air, including flights to the Kitimat power project in British Columbia, the Knob Lake iron mine in Labrador, and various localities in the Yukon and North-West Territories. He will spend four days attending the British Commonwealth and Empire Games in Vancouver. Return to the United Kingdom is scheduled for 18th August.

(For map of route see following page)

ROUTE MAP
HRH THE DUKE OF EDINBURGH'S VISIT TO CANADA
JULY 29TH TO AUGUST 17TH



ROYAL NEW ZEALAND AIR FORCE

R.N.Z.A.F. RIFLE CHAMPIONSHIPS

BY FLIGHT LIEUTENANT G. BENTLEY, R.N.Z.A.F.

Warrant Officer F. B. Haycock emerged the champion rifle shot of the Royal New Zealand Air Force for 1954 when the annual championships were held at Trentham Military Camp late in February. Warrant Officer Haycock, who is the station warrant officer at R.N.Z.A.F. Station Hobsonville, was presented with the Queen's Medal and the Watt Cup for his success in the S.R.(a) Championship.

This was the first time that the Queen's Medal had been competed for by R.N.Z.A.F. marksmen outside the United Kingdom.

The S.R.(b) Championship was won by Leading Aircraftman R. M. Cunning-

[Photo: G. Bentley

Warrant Officer F. B. Haycock, wearing the Queen's Medal with which he had just been presented, receives the Watt Cup from Air Commodore S. Wallingford, C.B., C.B.E., R.N.Z.A.F. (Retd.), at the presentation of trophies at the conclusion of the R.N.Z.A.F. Rifle Championships for 1954. Haycock won the S.R.(a) Championship and was the most successful competitor at the meeting.

ham, of Woodbourne, and the Inter-Station Teams Championship was won by Woodbourne.

Major successes in the four-day meeting were shared by Haycock and Cunningham, who received the largest share of the trophies presented by Air Commodore S. Wallingford, C.B., C.B.E., R.N.Z.A.F. (retired), a former president of the Association.

Warrant Officer Haycock has been prominent in R.N.Z.A.F. rifle championships in other years, with scores consistently near the top. Last year he competed at Bisley while serving with No. 14 Squadron in Cyprus, and his experience in Great Britain doubtless stood him in good stead, for his recent performances at Trentham showed him to be a true champion, with scores well up to Bisley standards. Besides winning the Queen's Medal and the Watt Cup in the S.R.(a) Championships, he won the Woodbourne Trophy and the Priest Trophy (for the Champion Revolver Shot) and he was runner-up for the Wigram Trophy (300 yards individual application shoot).

The 1953 champion shot, Squadron Leader H. L. Homer, who represented the R.N.Z.A.F. at Bisley last year, did not produce his best form in the early stages of the championships but he returned to form on the last day and obtained the best individual score in the Teams Championship, 170 out of a possible 200.

Trophies were won as follows:

Queen's Medal: Warrant Officer F. B. Haycock (Hobsonville).

Watt Cup (S.R.(a) Championship): 1, Warrant Officer Haycock (332 points); 2, Corporal C. G. Robertson, Whenuapai (308); 3, Sergeant T. F. Langley, Hobsonville (304).

S.R.(b) Championship: 1, Leading Aircraftman R. M. Cunningham, Woodbourne (231); 2, Flight Sergeant D. J. Caughley, Woodbourne (229); 3, Flight Lieutenant R. R. Smith, Whenuapai (227).

Inter-Station Teams Championship, S.R.(a), for the R.N.Z.A.F. Rose Bowl: 1, Woodbourne (715); 2, Hobsonville (689); 3, Ohakea (672); 4, Weedons (669).

Inter-Station Teams Championship, SR(b), for Te Rapa Shield: 1, Woodbourne (1,093); 2, Hobsonville (1,083); 3, Headquarters Unit (1,042); 4, Trentham Army (1,024).

Long Range Aggregate Trophy: Flight Lieutenant R. R. Smith.

Priest Trophy (revolver championship): Warrant Officer Haycock.

Wigram Trophy (300 yards individual application shoot): Flight Sergeant D. J. Caughley.

Woodbourne Trophy (fire with movement): Warrant Officer Haycock.

Taieri Trophy (300 yards rapid practice): Leading Aircraftman Cunningham.

Hobsonville Trophy (300 yards deliberate practice): Leading Aircraftman H. P. Lloyd (Woodbourne).

Lauthala Bay Trophy (600 yards deliberate practice): Leading Aircraftman Cunningham.

Ohakea Trophy (500 yards application): Leading Aircraftman Cunningham.

Over a hundred riflemen took part, and the competitors included members of the Women's Auxiliary Air Force and Army and Navy representatives.

SOUTH AFRICAN AIR FORCE

THE S.A.A.F. COLLEGE HAS REACHED MATURITY

[S.A.A.F. Official Photo

The C.G.S. inspecting the cadets at the passing-out parade.

EVERY airman present at the recent passing-out parade of Permanent Force Cadets, held at the S.A.A.F. College, must have been conscious of a feeling of pride when the Chief of the General Staff stated in his address that our College had reached maturity. It is opportune, therefore, to trace the progress of its development from the days when it was merely a dream in the minds of a few officers.

From the inception of the S.A.A.F., flying and technical training was given high priority and maintained at a high standard of efficiency, by prevailing standards. The staff officers and administrators, however, were very badly served—a "trickle" of officers passed through the Royal Air Force Staff College, and the administrators gained their training in the hard school of experience; by trial and, too often, error. In our small pre-war show this was perhaps a satisfactory arrangement, but the war and the rapid expansion which it necessitated, showed up our weakness in this important field. We were forced, more and more to rely on our allies from overseas and on our friends from the professional and commercial world who joined up for the duration, to provide the administrative backing which our fighting forces required. After demobilization, we found ourselves with an Air Force, large by pre-war standards, but with a handful of trained and experienced staff officers, to carry out the job of reorganizing and directing it.

It was not, however, to overcome the shortage of staff officers that the embryo was formed from which the College grew. The Air Force Wing of the South African Military College came into being in June, 1946, to cater for the air aspects of training at that institution. Major D. H. Loftus, D.S.O., D.F.C., was appointed Chief Instructor to the Wing, and it was largely due to his drive and unbounded enthusiasm that the mandate was extended until assistance to the Land Forces became a secondary, instead of the primary, commitment. In October, 1947, the Wing undertook to produce précis for study by officers due to write promotion examinations—a mammoth task which was completed in under six months. In July, 1948, a start was made on manuals of administration which were to have a profound effect on the standard and standardization of administration in all its aspects.

In the latter half of 1948 the S.A.A.F., in common with most Commonwealth forces, was feeling the effects of manpower shortage. For us, however, the position was somewhat aggravated by our contribution to the Berlin Airlift. Despite this, however, preparation went on for an administration course for officers and senior N.C.Os. which was eventually run from 11th April to 5th July, 1949. This course was of necessity experimental, but the results were so satisfactory that the sacrifices made to man it were considered to be well worth while and the advantages of administration training were firmly established. For the remainder of 1949, preparation went on for the next administration course in the light of experience gained, and translation of material into Afrikaans was given high priority. During all this time the Land/Air Warfare branch of the Wing progressed; the service to the Military College improved, and the foundation was laid for instruction in this vital study for the S.A.A.F.

In the first half of 1950, an administration course for P.F. officers of the S.A.A.F. was run with marked success. By that time several facts had become apparent. Firstly, the Air Force Wing provided the basis of an institution to cater for the staff training of Permanent Force officers of the S.A.A.F., the administration training in all its aspects for all ranks of the S.A.A.F. Permanent Force, the administration and Land/Air Warfare training of S.A.A.F. Active Citizen Force and Reserve Officers, the training of P.F./Air Cadets and, in addition, its original function—air instruction to Land Force students. The second fact which emerged was that such an institution could not be housed at the South African Military College. Consequently, on 1st July, 1950, the Air Staff Wing was redesignated the Air Administration and Staff School and established as separate S.A.A.F. unit at A.F.S., Waterkloof. While this was an important milestone in the history of our Air Force, it was with some trepidation and misgiving that the school discarded the protection of its mother College, particularly as it was about to undertake a most important and difficult commitment—an air staff course. The success achieved up to that period had been due in large measure to the kindly help and guidance of the Commandant and staff of the College, and this could no longer be as readily available to the School established on its own.

The first half of 1951 was devoted to the running of a third administration course for officers and to frantic preparation for Air Staff Course No. 1, which commenced on 2nd July. Students for this course were selected from the three administration courses which had been run up to that time. These three-month courses were virtually the first phase of the Staff Course, thus it was possible to complete the staff training in a further five months, but the burning of midnight oil was the rule for staff and students alike. On 7th December a party was held to celebrate the end of the course, and it was at that function that the fourteen jaded students and the five members of the directing and administrative staff heard the Chief of the General Staff announce that the status of the School had been upgraded to that of College. Thus the S.A.A.F. College came into being. To commemorate this auspicious occasion, the students presented the College with a magnificent chair on which was engraved the College crest. This set a precedent, and subsequent courses have presented a lecturer's rostrum, "roll of honour" boards, and numerous valuable pieces of silver and glassware. On such foundations is tradition built.

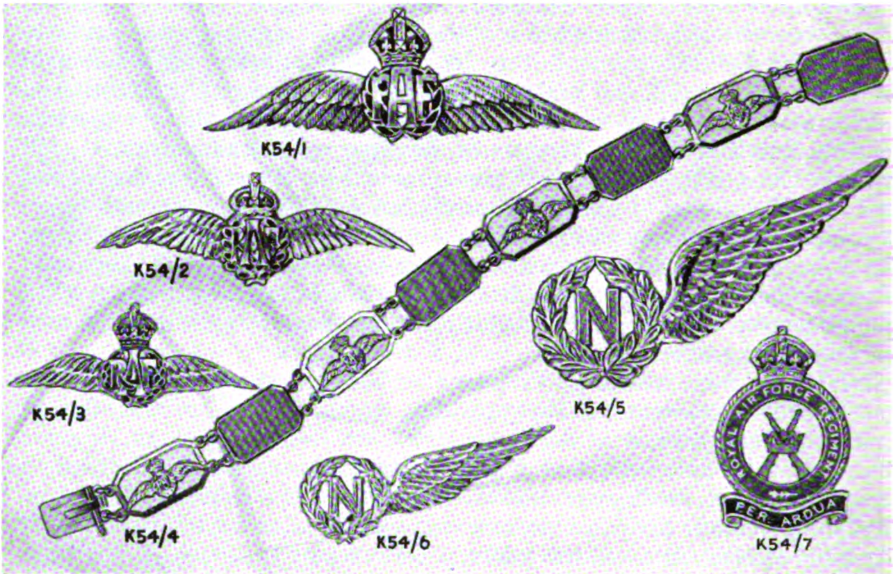
Since then two more Air Staff Courses have been completed, and the College has fulfilled its commitment by providing administration training for all branches and all ranks of the Air Force Permanent Force. In addition, Reserve Officers' Courses have been held in general and equipment administration and for operations and intelligence officers. This year, a new commitment will be the running of study periods and promotion examinations for both Permanent Force and Active Citizen Force officers. Unfortunately, though, it has been found essential to suspend staff course training for 1954, in order that study material may be revised and brought up to date.

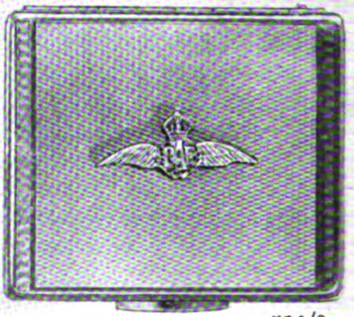
Statistics are always boring, but a few figures are pertinent in order to illustrate the magnitude of the achievement of the College with its limited staff. Thirty-four officers have qualified as staff officers, seventy-four A.C.F. and eighty-two P.F. officers have attended other courses, and no fewer than 178 other ranks have successfully completed administration or other courses appropriate to their branch. It was a great day when the first Permanent Force Air Cadet Course qualified for their commissions and a joint parade was held at the S.A.A.F. College for these nine cadets and these Land Force and Marine Cadets who had been trained at the Military College.

It is significant that at the time of writing all members of the directing staff are graduates of the S.A.A.F. College, all officers trained overseas having now been released for other duties.

No record of the development of the College would be complete without an acknowledgment of the assistance given by overseas institutions. The Royal Air Force and Royal Canadian Air Force Staff Colleges, the School of Land/Air Warfare, at Old Sarum, in the United Kingdom, and the United States Air University, have provided invaluable study material which has been adapted to local requirements. The ready assistance which has always been forthcoming has enabled our College to keep abreast of modern developments. The Witwatersrand and Pretoria Universities, too, have made substantial contributions by assisting with lectures on the more academic aspects of the training. In addition, private citizens, too numerous to mention, have given the benefit of their knowledge and experience in the national interest. To all these the College is deeply grateful.

One more milestone lies ahead—a permanent and suitable home for the College. At present it is housed as a lodger unit at A.F.S., Waterkloof, but the day cannot be too far distant when a suitable building will be available in which the true atmosphere of a College can be developed, and in which the College can build up, not only its maturity but its tradition.





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CONCERNING PERSONNEL

ROYAL AIR FORCE HONOURS, AWARDS, PROMOTIONS AND APPOINTMENTS

AWARDS

Her Majesty The Queen has been graciously pleased to approve the undermentioned Royal Air Force awards in recognition of distinguished service in Korean operations:

ORDER OF THE BRITISH EMPIRE

Wing Commander Donald Mackenzie, D.F.C., R.A.F.

DISTINGUISHED FLYING CROSS

Squadron Leader Harold Thomas Francis, R.A.F.
Flight Lieutenant Melville Glyn Bennett, R.A.F.
Flight Lieutenant Jean Raymond Arnaud, R.A.F.
Flying Officer George Arthur Chesworth, R.A.F.
Captain John Edward Teague Hoare, R.A.
Captain Donald John Browne, R.A.

DISTINGUISHED FLYING MEDAL

Flight Sergeant Kenneth Jameson, R.A.F.
Sergeant James Everley Kitching, R.A.F.

APPOINTMENTS

Among the appointments announced by the Air Ministry since the issue of the Spring, 1954, number of this Journal are the following:

AIR MINISTRY

Air Vice-Marshal H. V. Satterly, C.B. C.B.E., D.F.C., as Assistant Chief of the Air Staff (Operational Requirements) July, 1954.

Air Vice-Marshal L. T. Pankhurst, C.B.E., as Director General of Personnel (I).

Air Vice-Marshal S. R. Ubee, C.B., A.F.C., as Director General of Personnel (II).

Air Commodore J. A. S. Outhwaite, O.B.E., as Director of Aeronautical Inspection Services.

Air Commodore H. E. Nowell, C.B., O.B.E., as Director of Forecasting and Planning.

Air Commodore A. Earle, C.B.E., as Director of Policy (Air Staff).

BOMBER COMMAND

Air Commodore C. D. Candy, O.B.E., Royal Australian Air Force, as Senior Air Staff Officer, No. 3 Group.

FIGHTER COMMAND

Air Commodore H. A. V. Hogan, D.F.C., to command No. 81 Group.

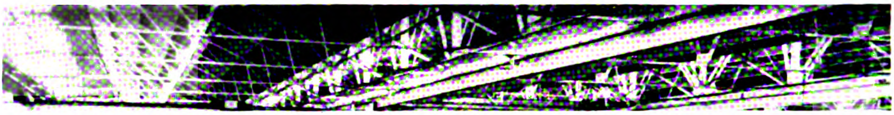
Air Commodore V. S. Bowling, C.B.E., as Commandant, Northern Sector.

COASTAL COMMAND

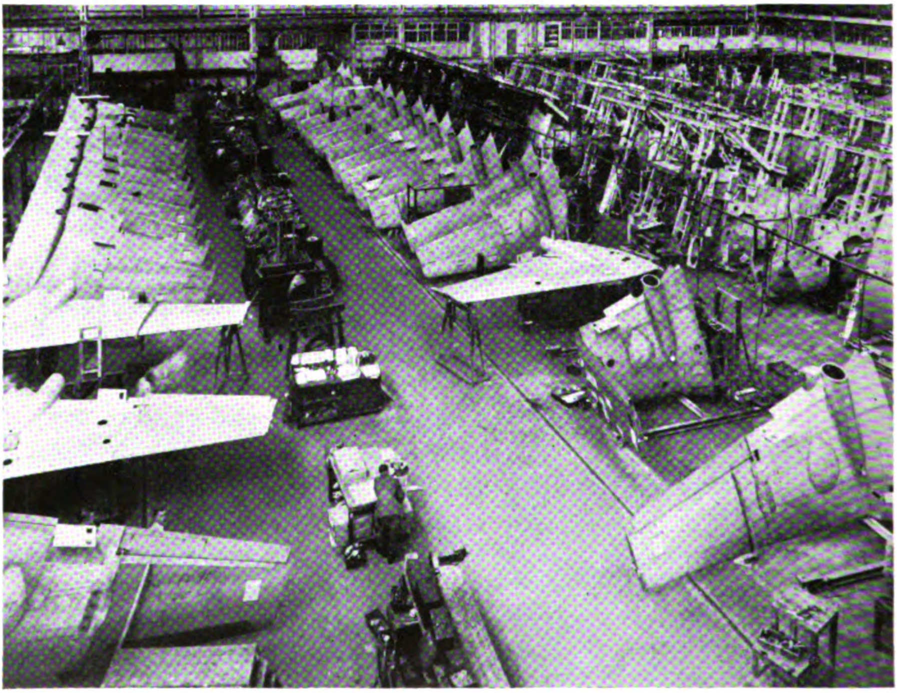
Air Vice-Marshal G. W. Tuttle, C.B., O.B.E., D.F.C., as Air Officer Commanding, No. 19 Group. (August, 1954.)

FLYING TRAINING COMMAND

Air Vice-Marshal N. S. Allinson, C.B., as Air Officer in charge of Administration.



FOLLAND CAPACITY



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HOME COMMAND

Air Vice-Marshal F. J. St. G. Braithewaite, C.B.E., as Air Officer Commanding, No. 61 Group.

MIDDLE EAST AIR FORCE

Air Vice-Marshal D. H. F. Barnett, C.B.E., D.F.C., as Air Officer Commanding, No. 205 Group.

WOMEN'S ROYAL AIR FORCE APPOINTMENTS

Group Officer A. Stephens, M.B.E., as Deputy Director W.R.A.F.

Group Officer J. L. A. Conan-Doyle, O.B.E., as Inspector of the W.R.A.F.

GROUP CAPTAINS' APPOINTMENTS

Group Captain H. P. Broad, C.B.E., D.F.C., to R.A.F. Station, Kuala Lumpur, to command.

Group Captain B. K. Burnett, D.F.C., A.F.C., A.D.C., to R.A.F. Station, Gaydon, to command.

Group Captain W. F. Beckwith, C.B.E., to the R.A.F. Technical College as Assistant Commandant.

Group Captain S. J. Marchbank, O.B.E., D.F.C., to R.A.F. Thorney Island, to command.

Group Captain R. N. McKern to Headquarters, No. 25 Group, for administrative staff duties.

Group Captain H. Stones to No. 90 Maintenance Unit, to command.

Group Captain H. E. Hopkins, D.F.C., A.F.C., to R.A.F. Station, Weston Zoyland, to command.

Group Captain J. C. Wells, D.F.C., to Air Ministry for duty in the Department of the Air Member for Supply and Organization.

Group Captain H. N. G. Wheeler, D.S.O., O.B.E., D.F.C., to the Air Ministry for duty in the Department of the Chief of the Air Staff.

Group Captain J. W. A. Hunnard to Headquarters, Far East Air Force, for administrative staff duties.

Group Captain F. C. Richardson to the Air Ministry for duty in the Department of the Air Member for Personnel.

Group Captain R. J. Gosnell, D.S.O., D.F.C., to R.A.F. Wildenrath, to command.

Group Captain H. E. Hopkins, D.F.C., A.F.C., to R.A.F. Station, Middleton St. George, to command.

Group Captain R. A. R. Rae, O.B.E., to Air Ministry for duty in Department of the Chief of the Air Staff.

Group Captain S. E. MacKenzie to the United Kingdom National Military Representative (Paris) for staff duties.

Group Captain W. I. G. Kerby, O.B.E., to Headquarters, 2nd Tactical Air Force, for administrative staff duties.

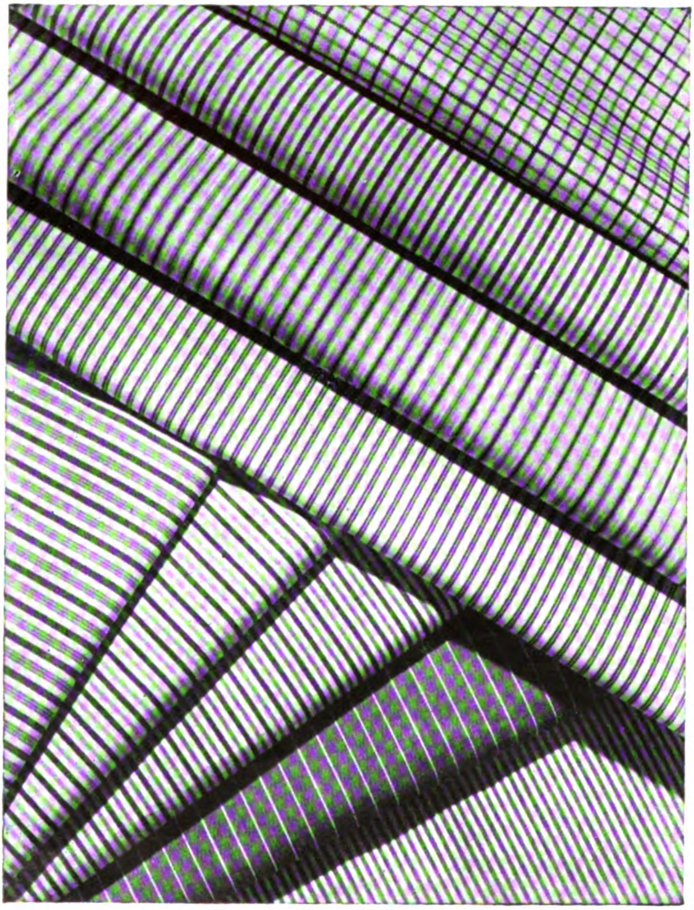
Group Captain J. C. Millar, D.S.O., to Headquarters, Bomber Command, as Chief Signals Officer.

Group Captain S. L. Blunt to Air Ministry for duty in the department of the Air Member for Supply and Organization.

Group Captain W. K. Le May, C.B.E., to Headquarters, Home Command, for administrative staff duties.

Group Captain L. G. Brown to be Deputy Provost Marshal (U.K.).

Group Captain G. F. Alexander, O.B.E., to Ministry of Supply.



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Group Captain J. B. Tait, D.S.O., D.F.C., to Headquarters, Middle East Air Force, for air staff duties.

Group Captain J. C. Larking, D.F.C., to R.A.F. Merryfield, to command.

Group Captain J. A. H. Louden to R.A.F. Uxbridge, to command.

Group Captain L. E. Giles to Headquarters, Bomber Command, for air staff duties.

Group Captain H. E. Dicken, O.B.E., to Ministry of Supply.

Group Captain C. C. Morton, C.B.E., to Headquarters, No. 90 Group, for air staff duties.

Group Captain D. S. Kite, to Headquarters Bomber Command, for technical staff duties.

Group Captain H. W. Mermagen, C.B.E., A.F.C., to Headquarters, Flying Training Command, for administrative staff duties.

Group Captain C. E. S. Lockett to R.A.F. Leconfield, to command.

Group Captain C. R. D. L. Lloyd to R.A.F. West Kirby, to command.

Group Captain E. J. P. Davy to Air Headquarters, Malta, as Senior Officer Administration.

Group Captain L. Fox, D.S.O., D.F.C., to R.A.F. Colerne, to command.

Group Captain R. I. K. Edwards, D.F.C., A.F.C., to Air Headquarters, Aden, for air staff duties.

Group Captain J. N. Baxter to Headquarters, No. 21 Group for air staff duties.

Group Captain R. E. Burns, D.F.C., to British Joint Staff Mission, Washington, for staff duties.

Group Captain G. T. B. Clayton, D.F.C., to R.A.F. Cottesmore, to command.

Group Captain K. J. Mellor, D.S.O., D.F.C., to R.A.F. Celle, to command.

Group Captain R. S. Ryan, C.B.E., to be Air Attaché, Stockholm.

Group Captain R. F. Fleming to R.A.F. Halton, for administrative duties.

Group Captain F. W. Judge to Air Ministry for duty in the department of the Air Member for Supply and Organization.

Group Captain W. A. J. Satchell, D.S.O., to R.A.F. Station, Cardington, to command.

Group Captain R. W. M. Clark, O.B.E., D.F.C., to Headquarters, No. 41 Group, for administrative staff duties.

Group Captain P. W. Stansfeld to S.H.A.P.E., for staff duties.

Group Captain O. M. Berkley, O.B.E., to Air Ministry for duty in the Department of the Air Member for Supply and Organization.

BIRTHDAY HONOURS LIST

K.C.B.

Air Marshal Sir John Nelson Boothman, K.B.E., C.B., D.F.C., A.F.C.
Air Marshal Walter Lloyd Dawson, C.B., C.B.E., D.S.O.

C.B.

Air Vice-Marshal Hugh Hamilton Brookes, C.B.E., D.F.C.
Air Vice-Marshal John Gerald Franks, C.B.E.
Acting Air Vice-Marshal Peter Dicken Cracroft, A.F.C.
Air Commodore Rowland Coats, M.A.
Air Commodore Kenneth Brian Boyd Cross, C.B.E., D.S.O., D.F.C.
Air Commodore Douglas Griffith Morris, C.B.E., D.S.O., D.F.C.
Air Commodore Ellacott Lyne Stephens Ward, D.F.C.
Group Captain Frederick John Manning, C.B.E.

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Air Chief Marshal Sir John Whitworth Jones, K.C.B., C.B.E. (Retired).

K.B.E.

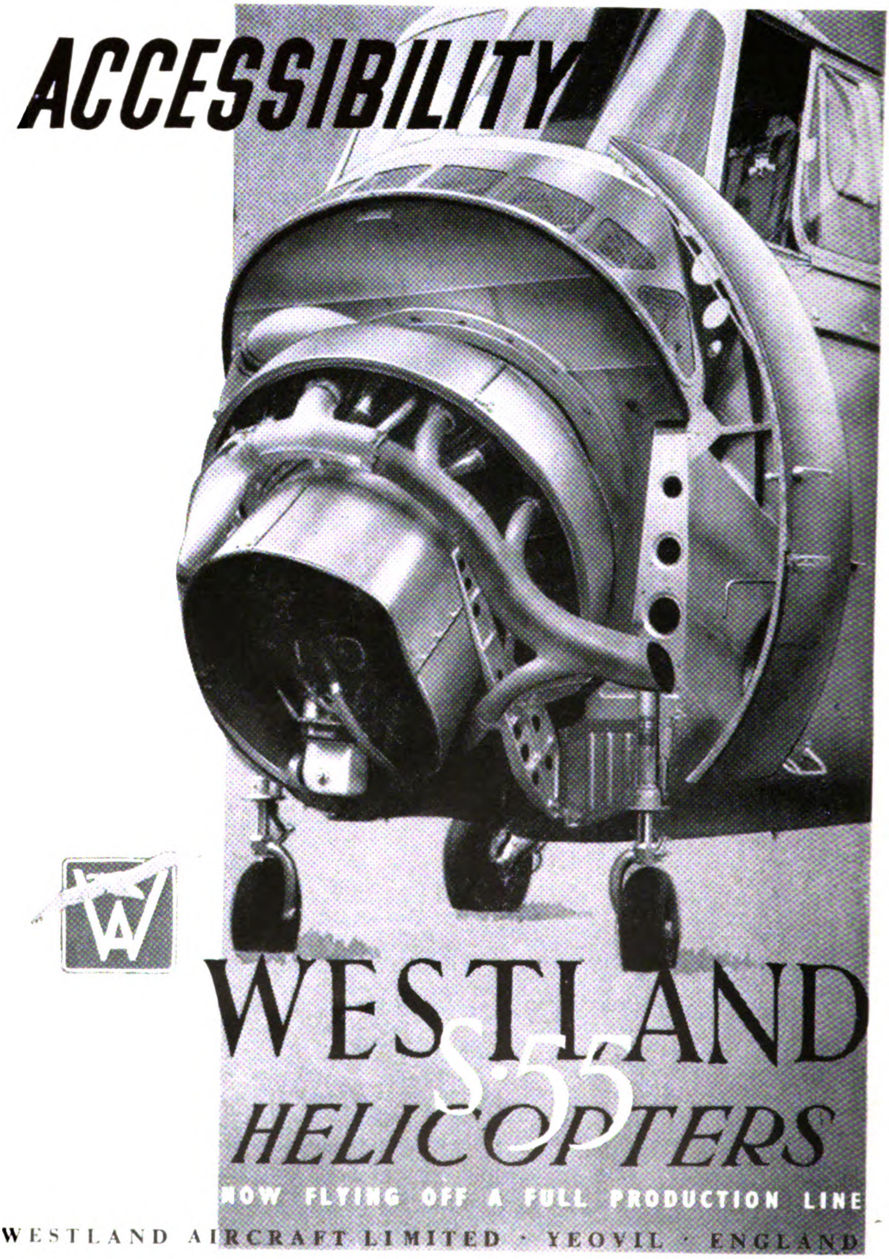
Air Marshal Lawrence Fleming Pendred, C.B., M.B.E., D.F.C.
Acting Air Marshal Gerald Ernest Gibbs, C.I.E., C.B.E., M.C.

C.B.E.

Acting Air Commodore Montagu Douglas Ommanney.
Group Captain John Robert Andre Embling, D.S.O.
Group Captain Walter Frederick Lamb, O.B.E.
Group Captain Cuthbert Vincent Mears.
Group Captain Peter Theodore Philpott, O.B.E.
Group Captain Charles Frederick George Rogers, O.B.E.
Group Captain Alan Allnutt Saw.
Group Captain Ernest Alfred Whiteley, D.F.C.
Group Captain Albert William Younghusband (Retired).

RETIREMENTS

Air Chief Marshal Sir Robert M. Foster, K.C.B., C.B.E., D.F.C.
Air Marshal Sir Alick C. Stevens, K.B.E., C.B.
Air Vice-Marshal C. P. Brown, C.B., C.B.E., D.F.C.
Air Vice-Marshal W. E. Theak, C.B., C.B.E.
Air Vice-Marshal C. E. H. Allen, C.B., D.F.C., B.A., M.I.Mech.E.



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BOOK REVIEWS

Royal Air Force 1939-1945. Volume 2—The Fight Avails. By Denis Richards and Hilary St. G. Saunders (Her Majesty's Stationery Office. 415 pp. Illustrated. 13s. 6d.).

I ended my review of the first volume of this war history in the spring issue of AIR POWER, with the remark that if Volumes II and III were as good as Volume I "the Royal Air Force need have no fear that its historians have failed to do justice to its splendid achievements." This new volume fully maintains the high standard, carrying the story from the closing months of 1941 to the second half of 1943, with part of the Italian campaign of the following year.

These were the years when the tide of war began to turn. In the Far East, Singapore, Sumatra, Java and Burma fell to the Japs. But in the West, Britain had survived the *Luftwaffe's* onslaught at home, and was beginning to strike back across the deserts of Cyrenaica and Tripolitania, on the beaches of Tunisia, side by side with her new Allies from America, then on to Sicily and Italy; while R.A.F. Bomber Command learned how to hurl hundreds—even a thousand—bombers in one night against the heart of German industry. Where as we had always felt sure we would not lose the war, we now began to lay the plans and forge the weapons to win it.

All these things are recorded in this volume; but if we are content to read them merely as a record of the past, 90 per cent. of their value will be lost. By far the most important aspect of the book is that it shows clearly how and why Germany lost the war; and by studying mistakes of the past—made by both sides—we can learn how to avoid them in future.

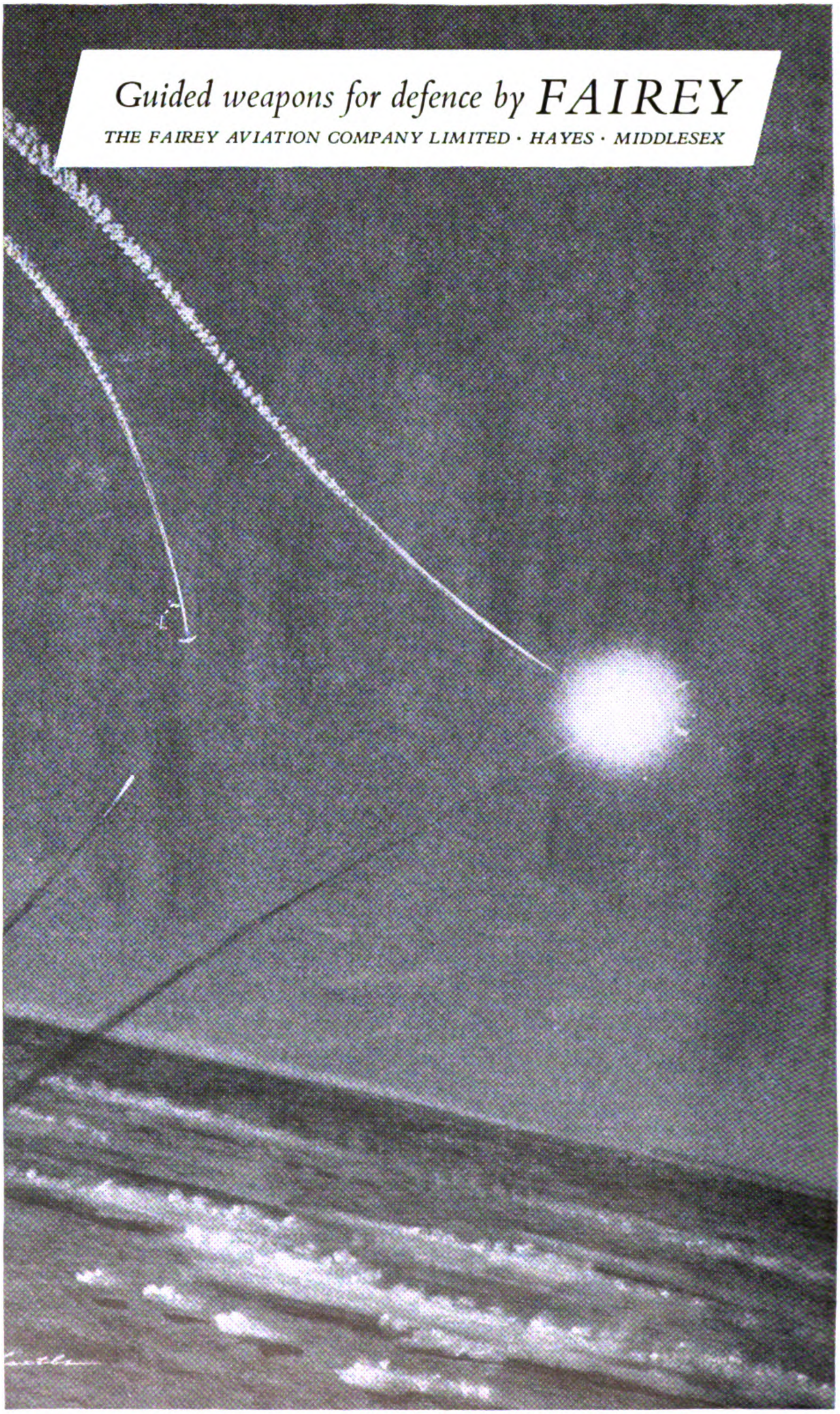
It is, for example, horrifying to read that a detailed description of the Japanese Zero fighter reached Air Force Headquarters in Singapore as early as July, 1941, only to be pigeon-holed. As a result, many pilots died later because they believed that their pathetic Buffalo fighters were faster and better than anything the Japs had. Similarly, we must ensure in future that inventions such as the Leigh Light, which played a great part in countering the menace of the U-boat, do not reach fruition only when the inventor knows personally his A.O.C.-in-C. and is unusually persistent.

The authors have done a fine job in showing how every branch of the Royal Air Force contributed to victory. The immense importance of photo-reconnaissance is shown repeatedly; and prominence is given to the little-publicized achievements of Fleet Air Arm Albacore flare-droppers which usually accompanied our night-bombers in North Africa. The personal story of the late Air Vice-Marshal Graham Dawson's work in the Middle East emphasizes the vital importance of efficient repair and salvage services. And statistics relating to mine-laying operations by Bomber and Coastal Commands are real eye-openers.

They show that between April, 1940 and March, 1943 these Commands laid nearly 16,000 mines at a cost of 329 aircraft; and that these mines sank 369 enemy ships totalling 361,821 tons. During the same period, Bomber, Coastal and Fighter Commands delivered some 3,700 attacks on ships at sea, at a cost of 648 aircraft, sinking 107 vessels totalling 155,076 tons. In other words, it cost us six aircraft to sink one ship by direct attack, but less than one aircraft to sink one ship by mining. So the U.S. Navy's forthcoming 600 m.p.h. Seamaster jet-engined mine-laying flying-boat seems to make good sense.

It is impossible to do justice to this book in a brief review, for every page contains something of interest. It is fascinating to read how our night bombing built up to full effectiveness after the early disappointment of "Gee" operations; how the "cab rank" ground attack technique was developed; and how the survival of Malta and disruption of Rommel's sea communications ended all possibility of a German victory in North Africa. Vexed questions like the bombing of Monte Cassino Monastery and of Rome are discussed frankly and fairly. But it is not all serious stuff—there are wonderful stories of heroism and humour—as when the *Luftwaffe* dropped hundreds of 2 kg. incendiary bombs on Malta and R.A.F. ground crews all rushed to fetch what was left of their meagre ration of bread, chose their own incendiary and then sat over it toasting their bread. How could Hitler—or anyone else—hope to conquer such men?

J. W. R. T.



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First Through the Clouds. By F. Warren Merriam. (B. T. Batsford Ltd., 4 Fitzhardinge Street, London, W.1. 176 pp. Illustrated. 21s.)

The author of this book had, by the end of 1918, flown over 5,000 hours, piloted nearly sixty different types of aircraft and taught just on a thousand pupils, many of whom became very famous airmen, so, although *First Through the Clouds* is not a great book, it could hardly fail to be interesting, especially to the older generation of pilots for whom, in the words of Air Chief Marshal Sir Philip Joubert's Foreword, it will "evoke a severe attack of nostalgia—the smell of burnt castor oil polluting the fragrance of a summer dawn as the Gnome engines were starting up; the anxious eyes of the tree-tops watching for the first sign of a breath of wind that would put a stop to instruction until perhaps the evening; the first circuit with the instructor, the cautious landings and the thrill of the first solo."

The title of the book refers to Mr. Merriam's claim that he was the first pilot to fly through the clouds into the airman's fairy-tale world of sun and beauty, on a day in 1912 when "zero ceiling" had grounded everyone else. His mount was a Bristol Boxkite without windscreen, cockpit, safety belt, instruments or anything else but a birdcage structure and a reliable engine. Needless to say, not all his flights had such happy endings and, like many Brooklands pilots, he has good reason to remember the sewage farm on the edge of the airfield.

There are accounts of many crashes, some tragic, a few humorous—but not all could be blamed on the aircraft. Take, for example, the case of a gentleman named Percival, who was flying a Caudron biplane. Apparently, he could not make the aircraft climb and, when she started side-slipping, he let go the controls and clung to the sides of the fuselage. Upon which the aircraft, knowing a good deal more than Mr. Percival about flying, corrected itself and flew straight on.

There are few readers who will not envy the author his personal memories of the great pioneers of powered flight in Britain; and fewer still who will not admire his courage, for he would probably never have flown at all if he had been subjected to the modern style of medical and selection boards in 1911, for he started to fly at the age of 31 with partially defective vision.

He makes some pertinent comments on present-day psychological tests, believing that "when all the factors that go to make or mar a pilot are closely examined, it will be discovered that by far the most important is the man's determination to fly." In this, he tends to overlook the fact that a supersonic, pressurized, complex jet fighter calls for entirely different piloting qualities to flying a Boxkite. But there is little doubt of the truth of some of his other theories—particularly on the value of gliding to build up interest in flying among the potential young pilots of the future. J. W. R. T.

Rescue Below Zero. By Ian Mackersey (Robert Hale, London. 155 pp.; 30 illustrations and 1 map. April, 1954. 15s. net).

This is a true story of a recent expedition to the Arctic, the purpose of which was to explore a site for a base situated only 700 miles from the Pole on an ice-cap 8,000 feet up. The ice-cap itself is 1,600 miles long, 700 miles across and in parts 10,000 feet thick, around whose bleak edges sweep 100-mile-an-hour blizzards and, in winter when a six-months' cloak of darkness envelops the far north, is gripped by temperatures of minus 90°.

The courage and endurance of those engaged upon such a venture, their struggle for survival even with every modern aid and the planning and execution of their project in the face of such fearful odds provides a thrilling story of devotion and heroism.

The exploration of the base was being undertaken by six members of the British North Greenland Expedition, but the story centres round officers and men of the Royal Air Force and Army who were engaged in providing the tons of supplies essential to their needs, about whom the leader of the expedition, Commander Simpson, said: "Without their co-operation the setting up of the base would not have been possible."

In the early summer of 1951, Sunderlands and their crews from Coastal Command, Royal Air Force, took Commander Simpson and four members of his party to Greenland for a preliminary survey of the selected area, the account of which makes an epic story in itself, but the book recounts in more detail the expedition in 1952. For this, Hastings and their crews from Transport Command, Royal Air Force, were engaged in dropping tons of supplies on this ice-cap, 8,000 feet up, by parachute and "free" drops, the latter necessitating flying under appalling conditions at only 80 feet. During one of these flights a Hastings crashed, marooning three injured men and four other members of the crew on the ice-cap.

Among the injured were an Army officer and one officer of the United States Air Force.

Unsuitably equipped, the terrible hardships they endured and, after a week, the rescue of

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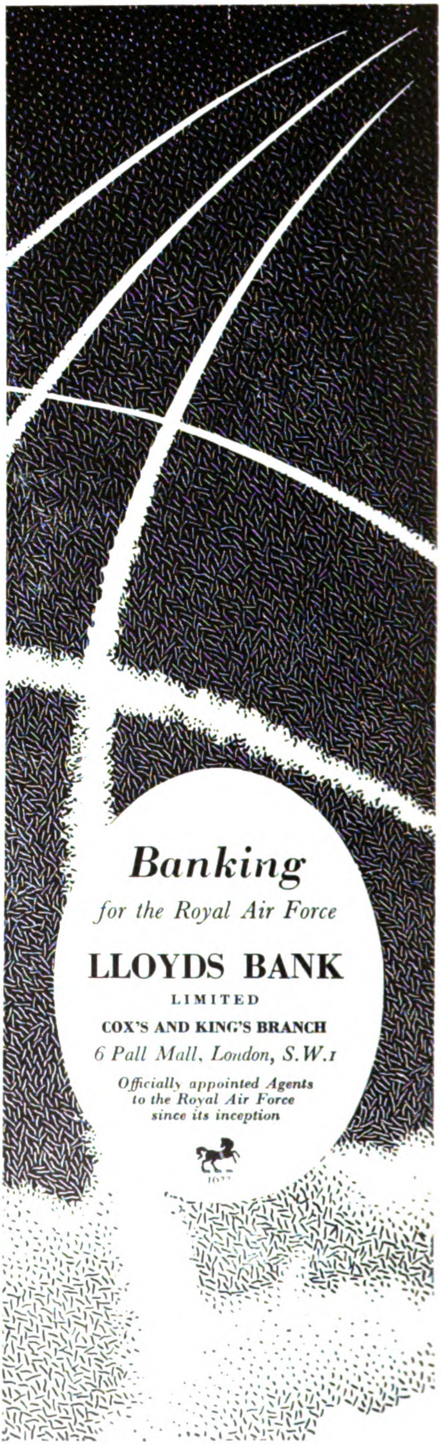

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the injured men by an amphibian of the U.S.A.F. from a base 500 miles away, with skis fitted to the floats, and three days later the rescue of the rest of the aircrew by a Dakota, is graphically described and holds the reader's attention to the last page of the book.

It is a story of comradeship and co-operation in its finest form between members of the expedition, the Royal Air Force and the United States Air Force under the most gruelling conditions imaginable. It provides a fine example of team spirit, enabling all concerned to fight through together against fearful odds to victory. A. H. S.

Reach For the Sky—The Story of Douglas Bader. By Paul Brickhill (Collins, London. 384 pp. 21 illustrations. 16s. net).

Douglas Bader needs no introduction to past and present members of the Royal Air Force and Commonwealth Air Forces, most of our readers will be well aware of his exploits in the Second World War, when as a fighter pilot he lived up to, and helped to maintain, the glorious traditions of the Royal Air Force. He was of that small band of this country's heroes who, during the Battle of Britain, inspired those now famous words of Winston Churchill, "Never has so much been owed, by so many, to so few." To the Royal Air Force College, Cranwell, he will remain for ever as a symbol of the aim for which it was founded by Lord Trenchard. A symbol of achievement which his successors will follow and try to live up to.

Those of us who knew him as a cadet and later as a young flying officer realized that the Air Force had a youngster of great promise, one who as a very fine sportsman and exceptional pilot would maintain the best standards of the Royal Air Force, As a youth, the slight "wildness" of his zeal was of the type which mellows with responsibility and, properly guided, produces fine leaders for a fighting air force.

This book is a much more comprehensive story of Douglas Bader, beginning with his childhood and school days, his experiences as a cadet at Cranwell and his life in a Squadron leading up to the peak of his skill as a peace-time pilot, when he was one of two who gave a magnificent display of individual aerobatics at the Hendon Air Display in 1931.

Then, in equally full detail, comes the description of the tragedy of his flying accident, which necessitated the amputation of both legs. The intimate inner story of the period of struggle that follows, rehabilitating himself to face life with so terrible a disability, shows how his indomitable courage and fierce determination brought him gradually back to a normal and full life; but his ambitions, such as a cap for England for Rugby, which he so nearly attained, had to be forgotten; but this he managed to replace in a lesser field by his prowess at golf and, even though now playing on artificial limbs, at tennis.

Further readjustments had to be faced by one trained for Service life, when for several years he struggled to make a living as a civilian.

A softer note creeps into the story when he meets the girl who, an ideal partner, smoothed out his "rough road," and whom he subsequently married and who was a great standby and consolation during periods of financial stringency and many disappointments. On the outbreak of war, having already proved to others that, limbless as he was, he was still a brilliant pilot, he overcame every obstacle put in his path and literally fought his way back into the Royal Air Force as a combatant pilot.

The rest of the story of his war exploits, his life as a prisoner of war and attempts at escape are familiar to most already, but it makes fascinating reading. Paul Brickhill was an ideal choice as the author for his book, himself a journalist, a fighter pilot and ex-prisoner of war, the author of *The Dam Busters, The Great Escape*, etc., has undoubtedly enhanced his reputation by his latest book, *Reach For the Sky*.

No one can fail to enjoy reading or fail to be inspired by this excellent book. A. H. S.

Oil in the Soviet Union. By Heinrich Hassmann. Translated by Alfred M. Leeston with a foreword by E. De Golyer. [Princetown University Press (London: Geoffrey Cumberlege). 173 pp.; 19 maps and charts; 30s.]

The appearance of Dr. Heinrich Hassmann's *Oil in the Soviet Union*, published originally in Germany in 1951 and now translated by an American oil expert, is timely and should do much to dispel the *mystique* that has begun to grow up around Soviet oil as it did around German oil during the late war. Dr. Hassmann, with commendable brevity, addresses himself to the task of giving his readers not only a useful picture of the place of the oil industry in the Soviet economy as a whole and its development since the early 1820's, but also a close-up of the state of Russia's oil-bearing regions today. This close-up will, almost certainly, prove to be of considerable interest to Service readers, as will Dr. Hassmann's interesting chapter on the problems now facing Russia's oilmen.

It is apparent from this book that Tsarist lease, auction and royalty systems, all of which

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were tried between 1821 and 1917 to encourage the development of Russia's oilfields, did not serve the young industry well. Nevertheless, it is interesting to note that between 1898 and 1901 Russian production was greater than the U.S.A.'s and actually amounted to about half the world's total. And whatever Soviet propaganda may now say to the contrary, Russia had, in 1914, a comparatively well-developed industry. War and revolution caused production to sink from 12 million tons (1902) to 3½ million (1920). At the beginning of the First Five-Year Plan (1928) production was back to the 1902 figure. By 1941 it had reached 33 million tons, dropping to 21 million (according to Dr. Hassman) in 1945. By the end of the Fourth Five-Year Plan (1950) production stood at 37½ million tons and there is promise that, by 1955, an output of at least 60 million tons may be reached.

Judged by Soviet standards (the only ones that apply), the rate of increase under the present Plan is impressive. On balance Dr. Hassman does not appear to believe that the supply of oil will prove to be the Achilles' heel of the Soviet economy. As he points out, the Soviet economy makes "lower requirements on its oil industry than other countries." Nor does the economic system itself, in his view, impede production. Though supply of steel may prove to be a "serious bottleneck," the industry, generally speaking, is firmly based. Only later will synthetic oil plants and hydrogenation factories "gain tremendous importance in the Soviet Union." Imported oil counts for little.

It is, perhaps, hardly surprising that Dr. Hassmann says little of the possible military uses of oil and practically nothing of Soviet aviation's needs. At times he finds himself at cross-purposes with his translator, who supplies notes of his own on a number of important matters, including oil in Soviet agriculture where Dr. Hassmann, not his translator, is probably nearer the mark. It is a pity that original Soviet sources are few, and secondary sources many. Several inconsistencies in transliteration and one bad misprint giving Russian steel production as 7 million tons in 1950 (p. 56) will doubtless be corrected in a second edition. The superficial epilogue on the Soviet Union and the Middle East might also be revised and expanded to advantage. However, readers in search of information on this poorly documented subject will find Dr. Hassmann's book sensible, stimulating and sobering.

J. F. L. L.

NEW BOOKS

BRIEFER COMMENT

Their Name Liveth. Vol. I.—Some Pictures of Commonwealth War Cemeteries, 1914-1918 and 1939-1945. With a message to relatives from Her Majesty The Queen. (Published for the Imperial War Graves Commission by Methuen & Co., London. 32 pp.; 65 illustrations; 15s. net). In this book there have been assembled sixty-five monochrome half-tone plates of war cemeteries and memorials in Italy, Sicily, France, England, Scotland, Norway, The Netherlands and Belgium. The size of this book, measuring 10 in. by 11½ in., lends itself to the production of plenty of detail, and the beauty of the war cemeteries are well and artistically portrayed—the "Silent Cities" as Rudyard Kipling called those of the 1914-1918 war. There is a Foreword by His Royal Highness The Duke of Gloucester, K.G., a short description of the work of the Imperial War Graves Commission and an essay by Edmund Blunden, C.B.E., M.C. The pictures are followed by historical and descriptive notes, as well as an outline of the campaigns or incidents of war which led to the formation of the cemeteries or the building of the memorials.

Communist Guerilla Warfare. By Brigadier C. Aubrey Dixon, O.B.E., and Otto Heilbrunn, with a Foreword by Lieutenant-General Sir Reginald F. S. Denning, K.B.E., C.B. (Allen and Unwin, London, 229 pp.; 12 illustrations; 9 maps or diagrams; 18s. net). This book deals with guerilla warfare in the U.S.S.R. during the last war. The authors, who have made an extensive study of this type of warfare, have produced what might well be termed a textbook on how to effectively carry on guerilla warfare and means of combating this menace. The campaign carried out against the German armies by the Russians was based on lessons learnt from the foremost strategist of guerilla warfare—Mao Tse-tung. During the last war our troops never met guerillas, as enemies, on a large scale, and it is time we should understand the implications of a type of warfare that has been developed to perfection by the Communists. All Soviet satellite States have formed their own guerilla brigades, and in any future war it would be essential to any belligerents to possess considerable knowledge of the tactics and strategy likely to govern their activities. This book offers just this kind of information, dealing with the organization and supply of guerillas, tactical talks, anti-guerilla action and its failure (in the case of the Germans' efforts)—it offers more than the lesson of the German-Russian campaign, it provides instruction likely to be of great value in any future war.

The Amazing Mr. Doolittle. By Quentin Reynolds. (Cassell, London. 313 pp.; May, 1954; 18s. net). A Biography of Lieutenant-General James H. Doolittle, who will be remembered best by the Royal Air Force as the Commander of the United States Eighth Air Force in Britain in 1944 and the U.S. Twelfth Air Force in the invasion of North Africa; they will also remember him as the leader of the spectacular and astonishing raid on Tokyo in 1942. In America, however, his name was a legend long before then as one of the most intrepid stunt pilots. His was a life crammed with adventure and this book makes interesting reading.

New Zealanders with the Royal Air Force. Vol. I. By Wing Commander H. L. Thompson. (Geoffrey Cumberlege, Oxford University Press, London, 408 pp.; 58 illustrations; 6 maps and 6 others in the text; 35s. net). Volume I of this official history of New Zealand in the Second World War, 1939-1945, covers the European Theatre from September, 1939, to December, 1942. The Foreword is by Marshal of the Royal Air Force, Lord Tedder, G.C.B. This book is mainly concerned with the 11,000 New Zealanders who served with the Royal Air Force, of whom 3,290 lost their lives. The great majority of these served as aircrew. Their services are recorded against the background of the history of the war in the air. The author, faced by the difficult task of giving an account of these war services, scattered as they were among Royal Air Force units in different theatres of war, has in Volume I successfully depicted the great part they played in the European Theatre. It is a history of the air operations in this theatre of war in which New Zealanders shared side by side with their colleagues from overseas and the Home Country the heat and burden of the day's work, and it is as "part of the ordinary day's work" that it is recorded. A factional record of some, at least, of the matchless deeds of New Zealand airmen.

Speeding Into Space. By Marie Neurath. (Max Parrish. London. 36 pp.; fully illustrated with coloured diagrams; April, 1954; 6s. board covers; 7s. 6d. cloth). For the air-minded children this book invites an intelligent interest in the space between the Earth, Moon and Mars, and the plans being made for man to visit these unknown regions and the difficulties that would have to be overcome in "Space Travel."

Radio Control of Model Aircraft. By G. Sommerhoff. (P. Marshall & Co., London. 164 pp.; illustrated throughout with diagrams). Explains the basic essentials of radio for control of model aircraft and gives advice for the more advanced experimental work. It also includes full constructional details for all the equipment required. This book provides an incentive to the modeller who has had no previous experience in this field and useful guidance to those already experimenting.

The Exam Secret. By Dennis B. Jackson, B.A. (A. G. Elliott, Right Way Books, Kingswood, Surrey. April, 1954. 127 pp.; 6s. net). Both children and adults (and possibly worried parents), will welcome any book which gives guidance to a method which will help students to pass examinations. It is written in a light vein which makes easy reading and contains hints on short cuts to learning as well as how to tackle exam papers. A book for those who suffer from that "exam complex."

More Humorous Tales from "Blackwood." (Blackwood, London. 441 pp.; 10s. 6d. net). Among the nineteen short, humorous stories are two which have an air force interest: *Heavier than Air*, relating events leading up to, and details of, a handicap race between a steamroller owned by a Flight Lieutenant and one of the Squadron's Hawker Furies, and *Two-Blocked*, a Naval yarn with much amusement for those of the Navy's air arm.

The Aeroplane Directory, 1954. (Compiled by the staff of "The Aeroplane." Temple Press, London. 546 pp.; indexed; 21s. net). This most useful classified Directory is published annually. The 1954 edition has been greatly improved by an easier system of reference to the various parts. For the first time guide cards with thumb tabs have been inserted, enabling the required Part to be identified at a glance. It is a complete guide to aviation throughout the British Commonwealth, its air forces, ministries, organizations, air lines, industries, flying clubs and aerodromes, together with a biographical section containing over 1,600 entries on "Who's Who in British Aviation." A most useful Directory for the reference library of all interested in aviation.

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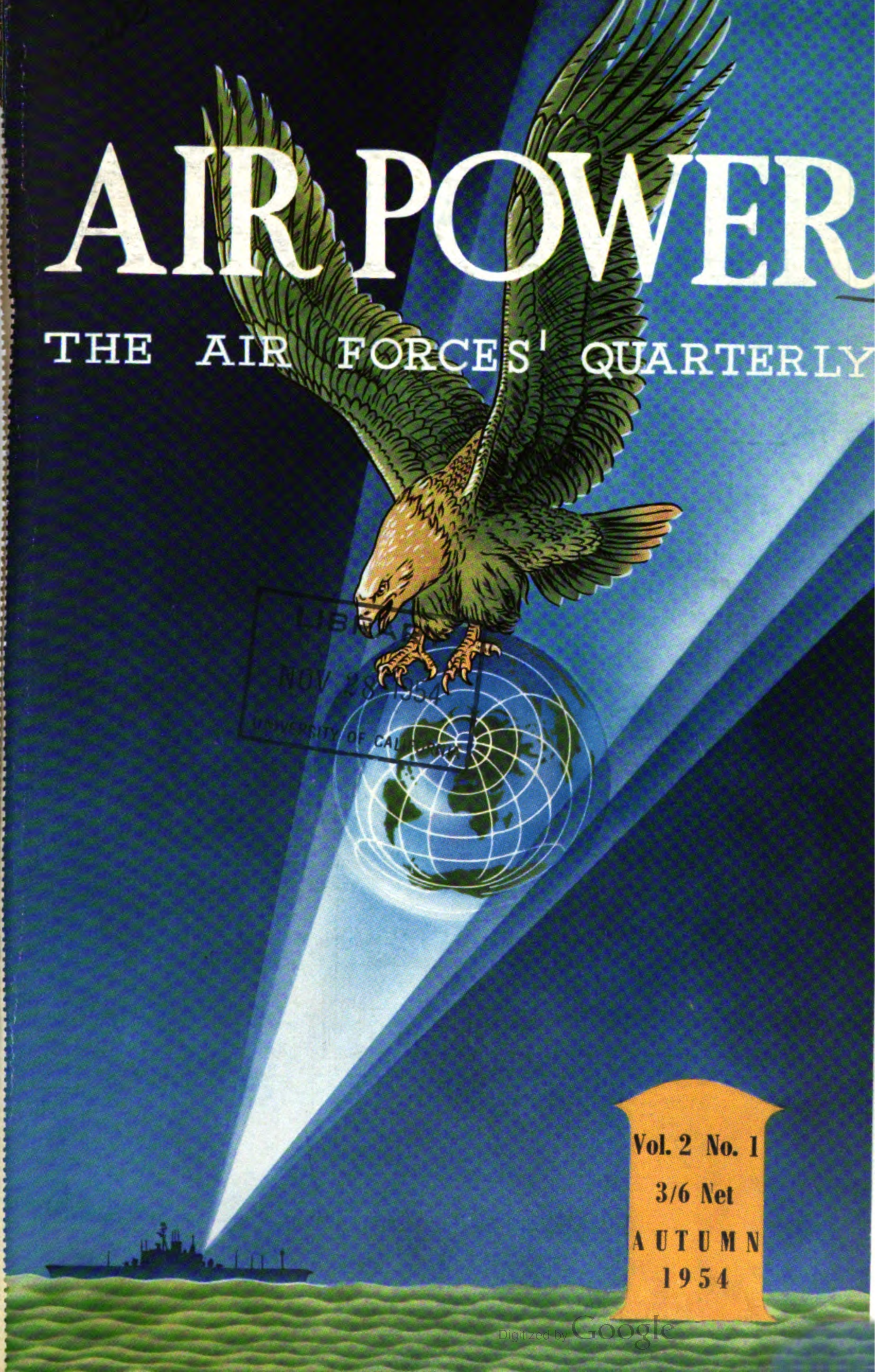

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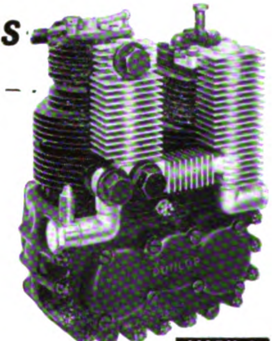

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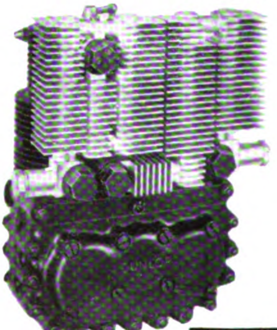

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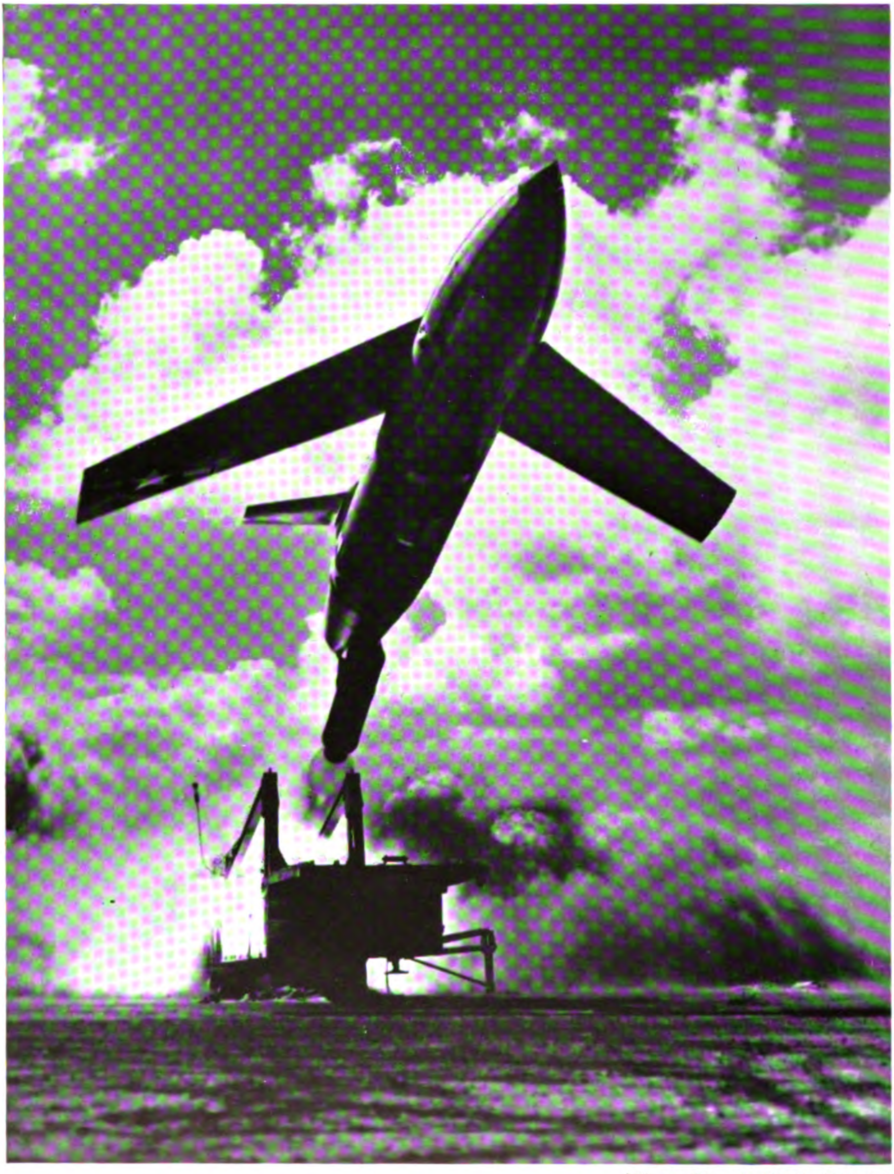


[Photo: Glenn L. Martin Company

PILOTLESS BOMBER

A U.S.A.F. B-61 Martin Matador roars away from its launcher, powered by an Allison turbo-jet engine and is of the type already in service in Europe. Its performance capacities are equal to that of conventional jet fighter planes.

EDITORIAL

"THE SWORD OF DAMOCLES"

WHEN discussing the development of the Atom and Hydrogen bombs and evaluating them as a deterrent against the launching of another total war, it is essential to take a commonsense view of the potentiality of these weapons.

The loss of life and devastation reported when the first atomic bomb fell on Hiroshima and the second one on Nagasaki caused a wave of horror to sweep across the world.

Press reports of the effect of the bomb were greatly exaggerated and Atomic Hysteria reigned supreme ; until a calmer study in the cold light of military science became possible.

The energy released by the Hiroshima bomb was computed as equivalent to 20,000 tons of high explosive, yet its useful *tactical* value was assessed as equal to 167 ten-ton blockbusters, each containing 5 tons of T.N.T.; reducing its computed equivalent to 835 tons of T.N.T. As we propose, for the sake of simplicity, to take the generally computed equivalent in tons of T.N.T. for subsequent bombs, it is as well to remember this disparity.

It is generally accepted that while America alone possessed the atomic bomb it acted as a strong deterrent to Russia taking action which would have inevitably led to a Third World War. This danger only increased when she obtained the secret and started adding atomic weapons to her already colossal armaments. The only deterrent possibly remaining was the larger stock-pile held by the Western Powers, which she set out to try and overtake.

America's answer to this was "Bigger and Better Bombs" and in April, 1951, she produced a further deterrent by exploding an atomic bomb with the equivalent of 50,000 tons of T.N.T.

But during this "uneasy peace" both sides continued to stock-pile these "Fission" bombs.

When in 1952 it was known that America had discovered the secret of making *and exploding* a Hydrogen ("Fusion") bomb, with an equivalent of 5,000,000 tons of T.N.T. and capable of complete destruction over an area of 21 square miles, an outcry was raised in certain quarters against continuing experiments in such frightfulness. No mention was made of the fact that America had already expressed her willingness for the control of the production of atomic weapons, *with certain safeguards* of proper inspection, or that Russia had refused these essential safeguards against unilateral disarmament.

Yet later, when Soviet statesmen announced publicly with some menacing satisfaction that she also had the secret of *making* Hydrogen bombs, oddly enough some of those who were most vociferous in their demands for these experiments to cease were silent. Naturally one wonders what was behind the earlier demands that America should be pressed to discontinue her experiments; was it that they knew that such demands on Russia would be ignored? To an extent the deterrent against a future total war must once again have been lessened.

Development took a further step in 1954, reaching its peak of frightfulness, when news of America's successful explosion of the H2-H3 bomb was released, with its equivalent of 12 to 14 million tons of T.N.T., capable of devastating areas with different degrees of destruction in a *radius* of 10 to 50 miles.

Even allowing that these figures are very approximate and remembering the disparity between its useful tactical value and comparative equivalent in tons of T.N.T., this is a fearful weapon of destruction and, in our view, must have brought an added deterrent to total war.

The fear occasioned by the fact that bombs with such powers of mass destruction can be dropped by aircraft hangs like "the Sword of Damocles" over a world slowly recovering its prosperity.

This "war of nerves" increases in intensity as each international crisis arises and diplomatic discussions follow in quick succession. The calmness of our national leaders as they explore every avenue for a peaceful solution must meet not only with approval but the greatest admiration for their patience.

A word to those who advocate our renunciation of atomic weapons as a gesture to our peaceful intentions. Firstly, no such gesture is necessary from nations well known to have no warlike intentions. Secondly, it would be a suicidal act by the Western Powers.

The Communists have the advantage of manpower—manpower in scores of millions, mainly elemental manpower bred to live off the land, moving forward with primitive means and almost primeval determination. These hordes are now backed by the most powerful land, sea and air forces with the most modern fighting equipment.

Taking the Western Powers as a whole, Russia is far more vulnerable to an atomic attack of the two, and our possession of A. & H. bombs largely nullifies the discrepancy in manpower. In the Russians' present mood, there is no likelier way of encouraging another total war than the relinquishing of our only means of devastating retaliation if we are attacked.

The atom bomb itself is not a "war winner"; it is but a strengthening of our air armaments. Each one would have to be delivered individually by aircraft: to do this we must be sufficiently strong to gain command of the air. Neither does it make navies and armies obsolete; we require each in adequate strength for the needs of a *modern* war.

The present position demands continued unity of the Western Powers; placing the most modern weapons that scientists can devise in the hands of our Defence Forces, who must have the will to use them if necessary; which is dependent upon the justice of our cause.

It is in the hearts of our peoples that our hope of survival rests; they must be convinced that a Democracy of God-fearing people is a better way of life than under totalitarian rule by Atheist Communists.

We are already engaged in the main battle, which is aimed at capturing the minds of men. *It is vital that we should devote as much attention to this as to the creation and production of weapons for our defence.*

What of the future?

There is not the smallest doubt that, if a Third World War comes, the A. & H. bombs would be used from the beginning by both sides, and many of the bombers carrying them would get to their target. The knowledge of this, strange as it may seem, gives us some hope of finally surviving these anxious years. These fearful weapons, from their very frightfulness, may act as a permanent deterrent against total war, at least until such time as sanity returns to the minds of those who now desire to impose their own ideology, by force if necessary, upon the rest of the world; particularly when they realize that any such war would be mutual suicide.

In the meantime we continue to sit under "The Sword of Damocles."

AMERICA'S V.T.O. FIGHTERS

BY JOHN W. R. TAYLOR

EVER since the first machine-gun was fitted to an aeroplane, altitude has been the key to success in air warfare. Even speed and fire-power are secondary, because a 300 m.p.h. unarmed bomber flying at 60,000 ft. would have little to worry about if hostile fighter forces—however fast and heavily armed—had an operational ceiling of only 45,000 ft.! Substitute a 600 m.p.h. atom-bomber like the British Vulcan, Victor or Valiant for the slower bomber in this example, and you have an idea of the problem confronting designers of present-day fighter aircraft.

Such a bomber would take just 5½ minutes to fly from the coast of Kent to London and, even if radar detected it well before it reached the coast, the warning system and the fighter squadrons would have to move very quickly indeed to ensure interception before the bomber reached its target. To make matters worse, destruction of 10 or even 20 per cent of an attacking force is no longer good enough to escape annihilation in an atomic age. The goal, however impossible to achieve, must be 100 per cent interception and every bright idea that can save a few precious seconds between the first radar sighting and the interception is worth its weight in gold—literally. One of the brightest ideas so far produced is vertical take-off.

WARTIME V.T.O. PROJECTS

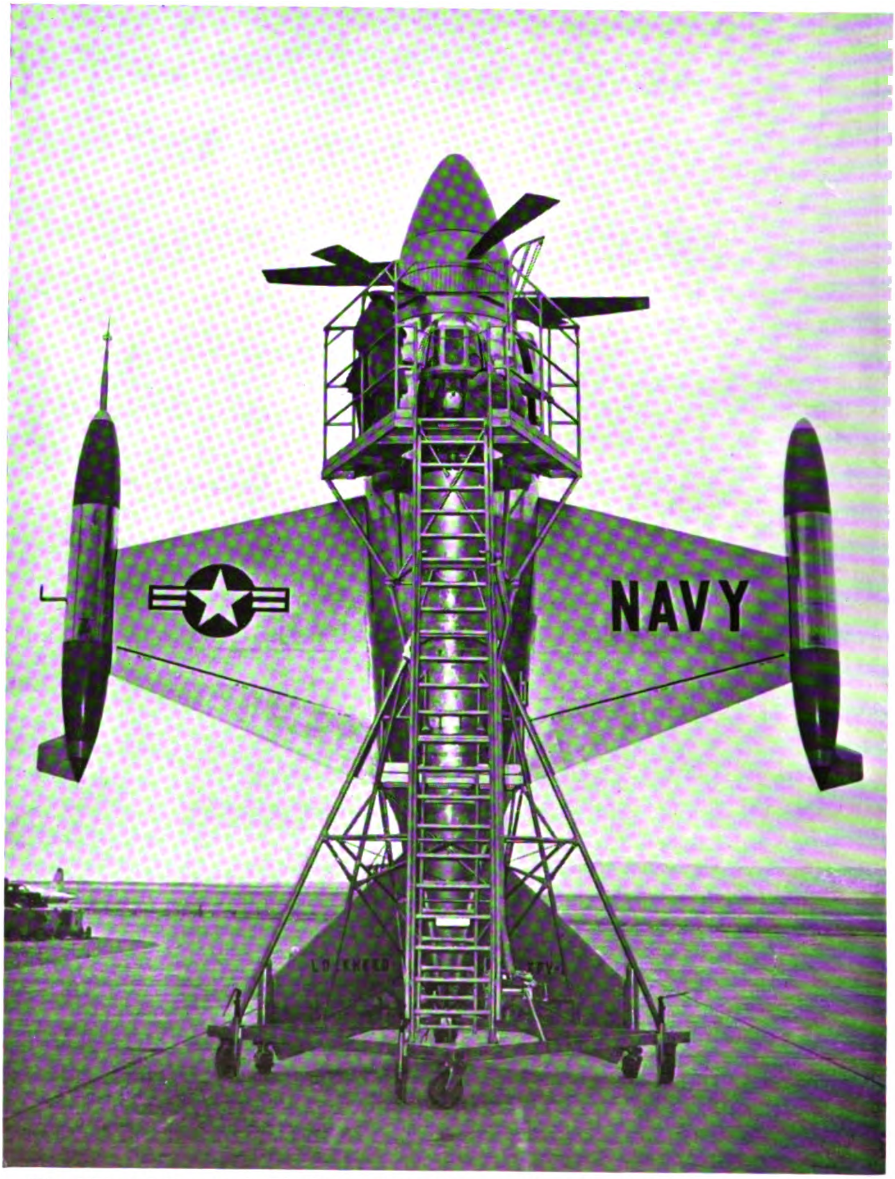
The Germans were the first to appreciate the value of a fighter that would take off vertically. By 1944 they were being hammered day and night by the Anglo-American bomber offensive. Their fighter production was still good; but it was not easy to get the new aircraft into action. Ground transport was slow; fuel was short and airfields subjected to continuous attack.

What fuel they had was often wasted by inefficient ground control, as on the occasion when U.S. " heavies " made a concentrated assault on the ball-bearing plant at Schweinfurth. Despite heavy losses, the bombers destroyed their target almost completely, because the German fighters, coming from far-away airfields, had to turn back as they ran out of fuel.

The obvious answer for the *Luftwaffe* was a fighter that could take off vertically, because it would not only be independent of vulnerable runways, but could also be based near every potential target, staying on the ground until the first wave of attacking bombers came in sight. The first requirement was unprecedented rate-of-climb, followed by heavy and accurate armament, sufficient to destroy several Allied aircraft in one sortie. Two entirely different solutions were offered by the Bachem and Focke-Wulf companies.

The Bachem Ba.349 Natter (Viper) was a tiny rocket-powered interceptor, designed to be launched vertically from a ramp. Of the simplest possible concept, its stubby cylindrical fuselage housed a battery of 33 R4M-type rocket projectiles behind a frangible plastic nose fairing, then the pilot, a 3,520 lb. thrust Walter 109-509A-1 rocket motor and fuel. Its 13 ft. span wings and tail were rectangular " mass production " units.

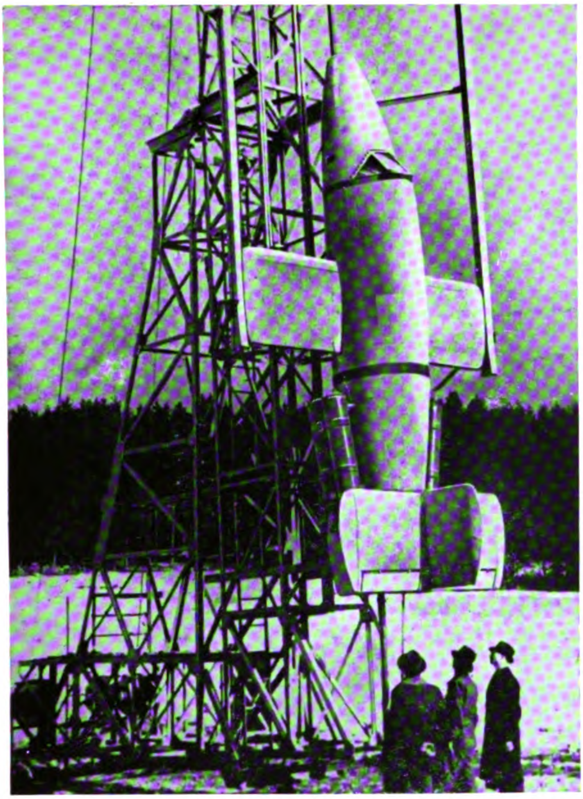
More of a piloted missile than an aircraft, it was intended to be guided by radar in the early stages of its 35,800 ft. per minute climb. At height, the pilot was supposed to take over, point the aircraft's nose towards his enemy, fire the rocket projectiles and then get out quickly on his ejector seat, as the disappearance of the rockets would cause the aircraft to become violently



The XFV-1 fully raised. The high mobile ladder enables the pilot to climb into his seat.

tail-heavy. The rear end of the fuselage, containing the engine, was supposed to break loose simultaneously and descend under its own parachute, leaving the rest of the airframe to crash.

Perhaps fortunately for Allied bomber crews—certainly for pilots of the *Luftwaffe*—the Natter was not ready for service by the time the war ended. Several pilotless models were launched successfully; but the only piloted one crashed and blew up immediately after leaving its ramp.



*The Ba.*349 *Natter.*

Focke - Wulf's V.T.O. project, which did not even reach the prototype stage, was a rotating wing aircraft weighing 11,400 lb., with a massive 37.4 ft. diameter three-bladed rotor revolving round its fuselage instead of on a conventional drive-shaft above it. Propulsion was by ramjet engines mounted at the tip of each rotor blade and armament four 30 mm. cannon.

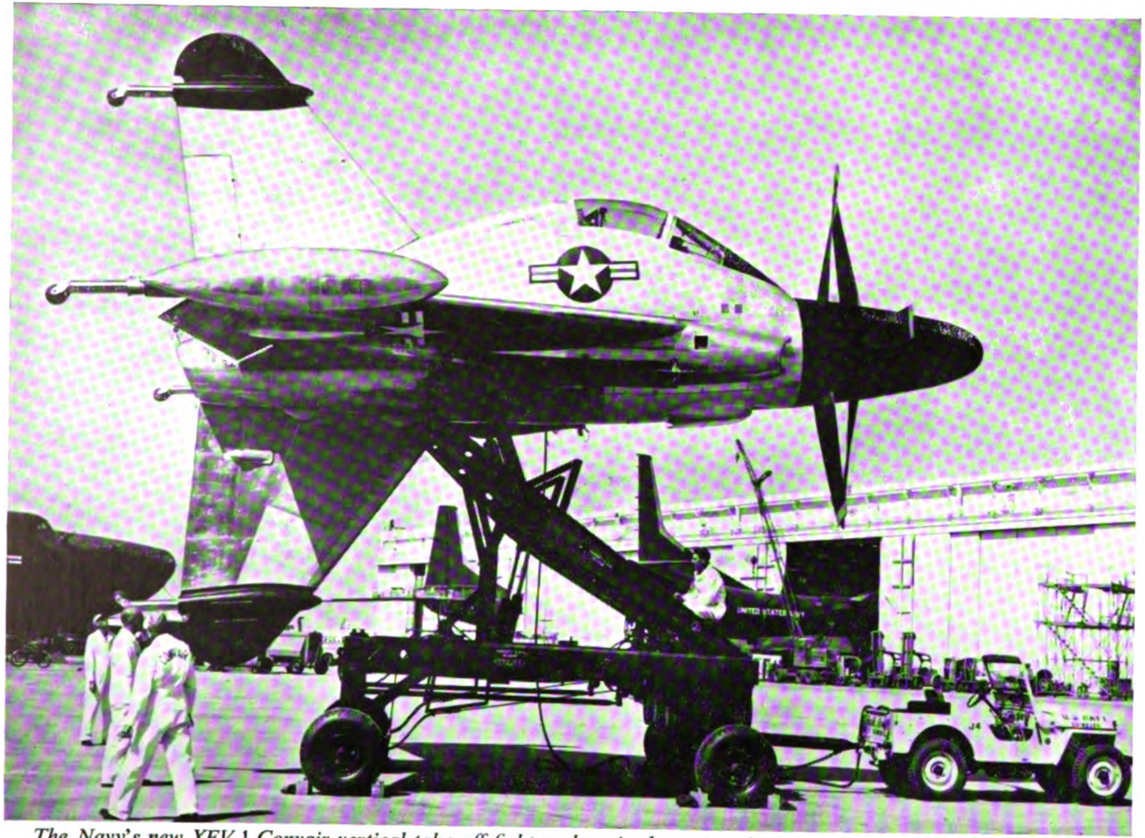
For take-off, the fighter was intended to stand vertically on small wheels under its cruciform tail, and climb away like a helicopter, but at a rate of 25,000 ft. per minute. On reaching an operational height of about 36,000 ft. the pilot would have been able to level out and chase Allied bombers at 520 m.p.h. for up to two hours, ending his flight with a tail-first vertical landing.

BRITISH INTEREST

Of the two wartime projects, the Natter was the more practical and promising. It did not call for delicate handling techniques during landing : and the idea of a cheap expendable airframe, needing no complicated maintenance, fitted in best with Germany's war potential at the time. Even more important, every item of research carried out on the Natter project would have contributed to the development of the pilotless anti-aircraft missiles that were planned to succeed it.

After the war, the British Ministry of Supply was sufficiently interested in the idea to promote a series of experiments with pilotless delta-wing V.T.O. rocket models, designed and built by the Fairey Aviation Company. They had a wing span of 10 ft. and their main power unit was a Beta rocket-motor, with two 900 lb. jets; which was supplemented by two 600 lb. solid-fuel booster rockets during the initial stages of launching from a ramp.

The first tests with these models were made from a ship in Cardigan Bay



The Navy's new XFV-1 Convair vertical take-off fighter plane is shown in a horizontal position as the plane would appear in straight and level flight. The special mobile vehicle which holds the plane can be used to transport it or raise and lower it to various positions for easier maintenance.

in May, 1949. A further series of test launchings followed at the Woomera Rocket Range in Australia; and Fairey's also completed a programme of full-scale piloted research, in continuation of the V.T.O. model work, with a tiny jet-powered delta-wing research aircraft designated the F.D.1, to Specification E10/47. No details of the results have been released, except that the model tests proved the practicability of launching V.T.O. rocket-interceptors at such low accelerations that they would in no way worry a pilot. But, as a postscript to the experiments, the Minister of Supply announced in the House of Commons on 19th July this year that his Ministry had "given contracts to a number of firms to undertake research into various methods of vertical or near-vertical take-off," other than by rotating wings, and that "engines and airframes suitable for this purpose are being developed." He added that he considered the scheme had very important military applications.

It is good to know that this country is not neglecting vertical take-off, for the Americans already have prototype V.T.O. interceptors flying and the Russians will not have overlooked the possibilities of such aircraft.

THE XFV-1 AND XFY-1

The first two American prototypes of which details have been released are the Lockheed XFV-1 and Convair XFY-1, both developed for the U.S. Navy. Their method of operation is similar; each is powered by a 5,500 e.h.p. Allison T-40 power plant, consisting of two separate side-by-side turbines driving contra-rotating propellers; and they both use the same technique of vertical take-off and tail-first landing as the wartime Focke-Wulf rotating wing project.

Their story started back in 1947, when the U.S. Navy began to show interest in V.T.O. fighters, as a step towards eliminating the need for big aircraft carriers in an age of atomic bombs and guided missiles. The Navy knew the sort of aircraft they wanted; but there was no engine for it.

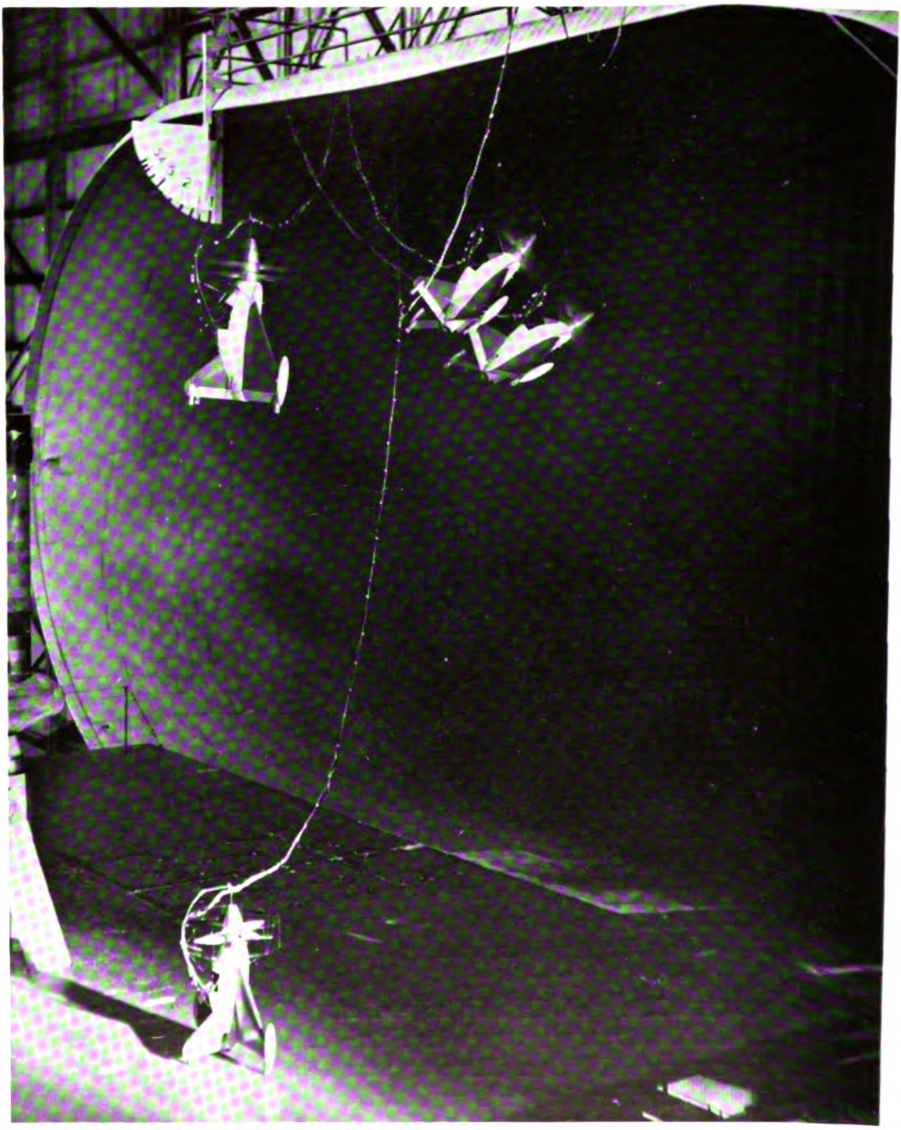
Even by keeping the fighter's size and weight as small as possible, it seemed unlikely to weigh less than about 14,000 lb. in fighting trim. So an engine giving considerably more than 14,000 lb. of thrust was needed to enable the aircraft to lift itself vertically from the ground and climb to operational height in one or two minutes.

By 1949, the Allison T-40 propeller-turbine had reached the stage where it offered a reasonable chance of success. So the Navy asked the U.S. National Advisory Committee for Aeronautics to co-operate in developing a V.T.O. fighter built around this power plant.

As a start, N.A.C.A. technicians designed and built a simple test model with a cylindrical fuselage, unswept wings and cruciform tail, powered by a 5 h.p. electric motor driving 2 ft. diameter contra-rotating propellers. Vertical take-off, hovering and landing tests with this model in the big Free Flight Wind Tunnel at the N.A.C.A.'s Langley Aeronautical Laboratory showed that there was no reason why a full-size aeroplane on the same lines should not be stable and controllable enough for operation afloat or ashore.

Nine famous companies in the U.S. aircraft industry were invited to submit design studies for such a plane and, in due course, the Navy ordered prototypes from Convair and Lockheed.

Although similar in power plant and method of operation, the two prototypes have completely different configurations. As one would expect from Convair—who flew the first successful delta-wing aeroplane in 1948 and have since gone into production with a fighter development designated the F-102—



This multiple exposure photograph shows the vertical-rising Convair XFY-1 flying in the full-scale tunnel at the N.A.C.A.'s Langley Aeronautical Laboratory. The model is shown on the tunnel floor before take-off, hovering vertically in still air, and flying forward into the wind as the tunnel air-speed is increased. During this and similar tests, the bottom vertical tail was removed from the delta-wing model to determine whether it could be flown satisfactorily in that condition long enough to permit the pilot to make a belly-landing in an emergency.

their XFY-1 is a delta. Quite apart from all the usual advantages claimed for delta wings, it has enabled Convair to position two of the "caster" landing wheels at the wing tips, with two more on the tips of the big top and bottom tail fins, giving wide-track undercarriage stability.

Lockheed have always favoured straight wings, even for supersonic fighters, believing that their aerodynamic and structural advantages more than outweigh the competing benefits of sweepback at transonic speeds. So their XFV-1 has a fairly conventional fuselage, straight wings and a cruciform tail, again with "caster" wheels at the tip of each fin. The track of the wheels is less than on the XFY-1; but the smaller tail has proved an asset during early flight trials, as will be explained later.

As soon as the two companies had completed their basic design work, "dynamically similar" models of each of the prototypes were built for testing in N.A.C.A. Free Flight Wind Tunnels. Very different from the kind of models one sees in the local park on a Saturday afternoon, they were perfect replicas of the full-size machines, with every component exactly to scale in shape, weight and dynamic loading. The ¼-scale Lockheed model stood 9 ft. high and was of all metal construction. The Convair one was smaller, but no less useful.

In the tunnel tests, they were first stood on their tail undercarriage in the launching position and subjected to high wind speeds to find out if the full-scale aircraft would be stable in a storm ashore or on the flight deck of a carrier moving at speed. Then their electric motors were opened up to full power, so that they rose vertically from the floor of the tunnel. As the air speed was increased the models levelled out and flew steadily in a normal horizontal cruising attitude. Finally, by slowing down the air speed and reducing the output of the models' electric motors, they were brought back to a vertical hovering position and allowed to lower themselves gently to the ground, tail first.

In this way, the practicability of each design was proved conclusively. Other tests showed that the Convair XFY-1 would remain stable in flight even after its lower tail-fin had been jettisoned for an emergency belly landing.

FULL-SCALE MOCK-UPS

Meanwhile, many other tests and experiments were being undertaken; for nothing has been left to chance in this V.T.O. design and development programme, which has already cost $20,000,000.

To prove the practicability of some of the unique features of the XFY-1, and to sort out such things as equipment stowage problems without holding up work on the prototype, Convair built a full-scale mock-up that was a marvel of completeness. Never before had there been such a workable mock-up, with equipment so perfectly simulated. Even the cockpit worked like the real thing—and this in itself was a triumph of engineering, for the pilot's seat in both V.T.O. fighters is designed to rotate automatically so that the pilot is in a semi-upright position while the aircraft is vertical and in a normal upright position during horizontal flight.

They also built a special engine test stand that simulated to a limited degree the performance and handling characteristics of the XFY-1 during take-off and landing. Consisting of a close facsimile of the aircraft's fuselage, mounted on a ramp, it was used by test pilot J. F. (Skeets) Coleman to get some idea of the "feel" of the V.T.O.'s controls. By opening the throttle, he could raise the fuselage several feet up the ramp, and then let it settle back gently, as in a tail-first landing.

Lockheed's test pilot, Herman (Fish) Salmon was even more fortunate. Because of the small span of the XFV-1's cruciform tail, its designers were able to fit a stalky fixed undercarriage under the fuselage of the prototype, so that it could be taxied along the ground and test " hopped " in a perfectly orthodox manner. As a result, Salmon has already been able to get the " feel " of the aircraft in the air in normal horizontal flight. He will, presumably, also practise hovering, by throttling back until the tail drops and the aircraft hangs on its propellers, and so take some of the sting out of the first true vertical take-off and landing tests that will follow in due course.

The big fin under the XFY-1's fuselage prevented Convair from fitting a similar temporary undercarriage to their prototype. Instead they shipped it to Moffett Naval Air Station, near San Francisco, for tethered flight tests inside a 184 ft. high airship hangar. During these tests, the aircraft was suspended vertically from the hangar roof by a cable, which was attached to its nose and connected by a pulley system to other cables running from the wing tips and fins to the hangar floor. During the first tests, this rig permitted Coleman to open the throttle and raise the aircraft off the ground without it ever being out of control from the ground. Later, the cables were slackened, so that he could make properly controlled take-offs and landings and even achieve a degree of lateral movement—for the V.T.O. fighters can be flown sideways, backward, forward, up and down, just like a helicopter. Finally, the hangar doors were opened to let in a stiffish wind and so prove the effectiveness of the XFY-1's controls under " outside " conditions.

At the time this is being written the Convair XFY-1 is about to be moved to Brown Field Naval Auxiliary Air Station, south of San Diego, for its proper flight tests. News of its progress, and that of the Lockheed XFV-1, will be awaited with unusual interest by the rest of the world, for there is little doubt that these aircraft are but the first of a completely new generation of target defence interceptors.

It is unlikely that the XFY-1 or the XFV-1 will be put into production in their present forms; because the Allison T-40 power plant gives them a maximum speed of only about 500 m.p.h., which is hardly fast enough for a modern interceptor—even one that climbs vertically. But they will sort out many of the inevitable " bugs " of vertical flight, and there are already rumours of turbojet-powered V.T.O. interceptors, designed by Ryan, Bell and Lockheed, to follow.

These may well be faster, especially if the jet-power is supplemented by rockets. In addition the absence of propellers will make possible initial flight tests with a fixed undercarriage, like that used on the Lockheed XFV-1, and will lessen the dangers of an emergency belly landing. In fact, it would seem far more practical to let the turbojet V.T.Os. land on their belly *every* time, either on retractable skids or on a rubber deck fitted with carrier-type arrester gear and crash nets, because there is a tremendous difference between a test pilot landing a V.T.O. tail-first under perfect conditions and a much less experienced service pilot trying to land it on the flight deck of a ship that might be moving at 20 knots, rolling and pitching in bad weather!

But whatever the shape and method of landing that eventually prove best, there is no doubt that the V.T.O. interceptor has a great future, at least until fully efficient anti-aircraft guided weapons are available.

CANBERRAS OVER EUROPE

BY THOMAS COCHRANE

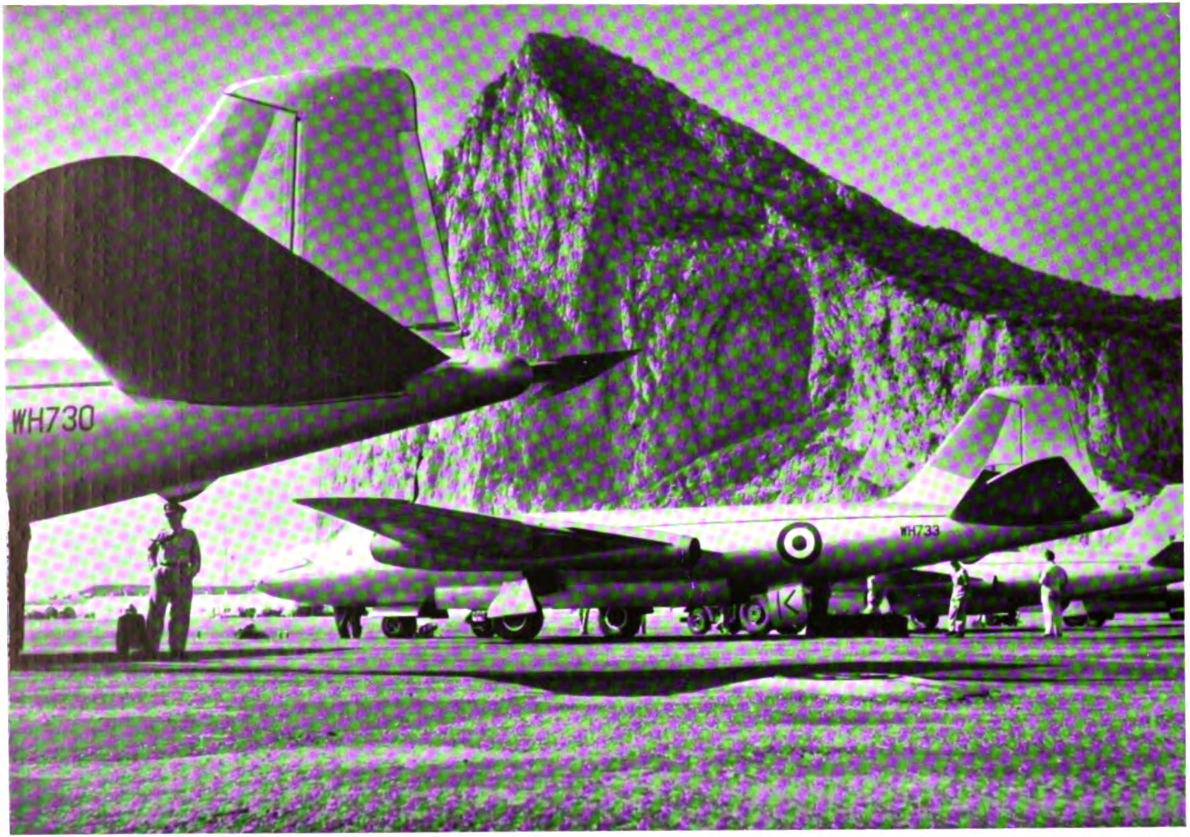
TALKING with one of the members of the Royal Air Force Canberra squadron recently returned from a highly successful tour of six European countries, a pilot of the Royal Hellenic Air Force spoke with affection of his training in England as the two stood on the roof garden of the Officers' Club looking out over the blue waters of Phaleron Bay towards the Acropolis. The Greek officer, now an instructor at Tatoi, went on to speak of his subsequent journey to America for a gunnery course at Las Vegas and how he had met there on the staff of the training school a flight lieutenant of the Royal Air Force on an exchange posting to the U.S.A.F.

The next day at the luncheon given in honour of the Force on its arrival at Yesilköy, the civil airport outside Istanbul, the same officer found himself next to a young Turkish officer who like hundreds of his compatriots was trained to fly at Cranwell during the war. The Turkish captain also spoke of his having taken a gunnery instructor's course at Las Vegas and he, too, knew the R.A.F. officer the Greek pilot had spoken of the evening before.

This coincidence is symptomatic of the common fellowship of the air that all flyers share, but it was also peculiarly indicative of the type of experience these R.A.F. officers encountered on their 8,500 mile journey through Southern Europe and the Mediterranean. Time and time again proof was given of the major way in which British and American training and assistance, given to these foreign air forces, provide a common experience and practice so invaluable to the successful working together of allies.

This visit by six Canberras of No. 27 Squadron (Squadron Leader Douglas Chopping, D.F.C.) and led by the Air Officer Commanding No. 1 Group, Bomber Command (Air Vice-Marshal J. R. Whitley) to France, Italy, Greece, Turkey, Yugoslavia and Portugal was the first of its kind undertaken by the Royal Air Force in Europe. Canberras from No. 1 Group made a spectacular tour of South America in 1952, but then the countries visited were not our allies within N.A.T.O. each with a direct interest in the contribution the other was making to the strengthening of the security of the West. The countries visited have no jet bomber aircraft in being or in contemplation as far as is known, but there were clear signs of a lively interest in this high-flying, speedy and manœuvrable British aircraft in many quarters. The Southern European countries principally devote their air power to tactical forces, closely linked with the army. For such tasks as reconnaissance and interdiction the Canberra would be a valuable addition to these tactical air formations and certainly in Yugoslavia it would suggest itself as a natural replacement for the 20 Mosquitoes the British Government gave to the air force there in 1951. The difficulty in realizing any such ambitions is largely a financial one. Italy, Greece, Turkey, Portugal and Yugoslavia have been generously supplied with American F.84 Thunderjets—these trim fighter-bombers were met with all the way from Rheims to Lisbon—but the price of military aircraft is high and a major re-equipment is a problem of undoubted magnitude for these governments.

At Rheims, Rome, Athens, Belgrade and Lisbon, the Canberras gave a specially prepared demonstration intended to show the aircraft's exceptional compass in speed, its manœuvrability and its high rate of climb. There was



[Air Ministry Photo

Some of the Canberras of No. 27 Squadron at Gibraltar.

no doubt that these qualities were well brought out by the skilful flying of this typical Canberra squadron of Bomber Command, and the watching officers at these displays must have appreciated to the full this tangible evidence of one of the more important elements of British air power available to the Supreme Commander, Allied Powers, Europe.

At the French Air Force base, named Marin La Meslee, just outside Rheims which was first visited, the squadron spent two days in the closest amity with the Commander and members of the 3rd Wing of the Armée de l'Air. In return for the Canberra demonstration the French pilots put on a polished show of formation aerobatics for their British guests. This air base in Champagne has close ties with the Royal Air Force, as the headquarters of the Advanced Air Striking Force was there until the country was overrun by the Germans. In Rome the visit was somewhat more formal with the demonstration given before many hundreds of Italian Air Force Officers, the Diplomatic Corps and the British community as well as many thousands of the general public. The Italian Air Force were gracious hosts and being in Rome they were considerate in allowing time for a sightseeing tour of the Eternal City and a day on the Air Force's private beach at Fregene, where the visitors took modest doses of the warm Mediterranean sun after the sudden change from the stark bitterness of the Lincolnshire weather they had left three days before.

The squadron was honoured by the presence of King Paul of the Hellenes when they gave their demonstration at Hellenikon airport outside Athens. King Paul, a flyer himself, was much impressed by the demonstration and delayed his departure to congratulate Squadron Leader Chopping and his crews on their fine performance. The Canberras were also flown to two R.H.A.F. bases, where the reception was of the kindest, and in the case of the many officers who had been trained by the R.A.F. there was no doubt of the deep affection they feel for the British service. In Turkey it was unfortunately not possible to put on the prepared demonstration nor to visit bases of the Turkish Air Force, but both Ankara and Istanbul saw some spectacular flying over the cities' minarets. In Yugoslavia many precedents were broken. It was the first visit of its kind made by the Royal Air Force. The squadron operated from Y.A.F. base, Batajnica, which was thrown open to the public for the demonstration for the first time, and by express invitation the Canberras made some extremely low runs at full speed over the capital, where some 20,000 citizens stood in the streets, the parks and particularly on the Kalemagdan, the main aiming point at the confluence of the Rivers Sava and Danube. Earlier in the day during the V.I.P. flights from Batajnica the British Ambassador, Sir Ivo Mallet, had the distinctive experience of passing over his residence at a speed well in excess of 500 m.p.h. The demonstration given at Batajnica was undoubtedly the most impressive, and the following morning the Force was singularly honoured by General Lazarivic and other senior officers who came to the airfield to shake hands with each British flyer and wish him a safe journey.

In Portugal there was a nice balance of experience for the Force. Based at the Portuguese Air Force airfield of Ota, 25 miles from Lisbon, the Canberras came to the capital's airport of Portela to give their demonstration before several thousand people. Five Ministers, including the Minister of Defence, Colonel Santos Costa, the Minister of Foreign Affairs, Dr. Paulo Cunba, the Chief of the Air Staff, General Costa Macedo, and the British

Ambassador, Sir Nigel Ronald, were among those present at this last demonstration of the tour.

This represented the liaison and goodwill aspects of the tour, but Air Vice-Marshal Whitley must be well satisfied with the way in which the Canberra again showed its sterling reliability, his aircrews their excellent airmanship over difficult terrain, and the maintenance crews their capacity to keep the aircraft serviceable with the spares carried by the Force in the two Hastings of Transport Command which made the same journey as the Canberras in something like twice the flying time. The most exacting part of the tour for the Canberra crews was the tremendous temperatures reached in the cockpit when on the ground in Rome, Greece, Turkey and Yugoslavia. Under the canopy the temperature was often more than 120 degrees Fahrenheit and in spite of air-cooling suits flying overalls soon became drenched with perspiration. Complete air conditioning for the cabin now being incorporated in Canberras will overcome this problem. At the other extreme when flying the 1,000 mile leg from Malta to Gibraltar the temperature outside the aircraft was minus 53 degrees Centigrade and in the turbulence of a jet stream minus 61 degrees, and one of the navigators who in Turkey had been afflicted with heat exhaustion found himself threatened with frost-bite as he lay in the nose, map-reading. To combat any return of heat exhaustion he was in flying overalls and little else and had to come back from the nose under the warmth of the sun-drenched canopy to restore circulation. The members of the squadron maintained themselves as good ambassadors and took the various changes in climate, food and conditions with equability in spite of the fact that for many of the junior officers it was the first time that they had been to any of the countries visited. To Air Vice-Marshal Whitley naturally fell the burden of the formal speechmaking and in most of the capitals he had a heavy list of official calls. In a less formal way the non-commissioned officers found among them a flight sergeant with a marked gift for making speeches and he inevitably was nominated to make presentations or give thanks to hosts. There was no doubt that our flight-sergeant spokesman came from Newcastle and, as he put it after some speech-making in Rome, "I need two interpreters: one to translate Geordie into English, and another English into Italian."

With so much evidence of goodwill engendered by the tour there could be no doubt of its success, and the natural sequel of return visits to England by the air forces visited would be a further step in demonstrating the unity of purpose among the Western Allies. All such journeys from an Air Force point of view are of real practical value on the training side, not only in flying over new territory but also as an exercise in mobility. But above all an air squadron can take itself right into the heart of the countries it visits that no other means provides, and there can be no doubt that the citizens of Rome, Athens, Ankara, Belgrade and Lisbon will long remember their first sight of a jet bomber and associate it in their memory with the Royal Air Force.

CONTROL OF SEA COMMUNICATIONS IN A FUTURE WAR

By Rear-Admiral H. E. Horan, C.B., D.S.C., R.N.

THERE is a great problem facing those who are responsible for the control of the sea communications not only of these Islands but of the Western Allies if "by any mischance or miscalculation" another global war is ever forced on us. Few people realize that to keep the people of the United Kingdom above the starvation level and the wheels of industry turning, 1,000,000 tons of imports per week must be safely delivered in our ports. That it was done in World War II, when for so long and with scant resources this country did it on her own, is something to be admired and wondered at. At one time the odds against it being done were big and it was only when a correct distribution of our available sea, land and air forces in this vital task was made that success was assured.

The international situation at the moment is perfectly clear. The only enemy that threatens not only these Islands but also the western democracies is Russia, and that country, since the end of World War II, has maintained her armed strength at wartime level and has more than 50 per cent of her industrial production employed in the production of armaments. Two world wars have clearly proved that the Achilles heel of Great Britain, and for that matter the Dominions, is sea communications, and in both these wars the enemy made a dead set at them with, for some time, what appeared to be disastrous results from our point of view. But in the end control was re-established and the war effort was maintained.

Facing Russia we now have the powers (14 in number) who have signed their names to the North Atlantic Treaty Organization. This of course is a great accession of strength at sea, on the land and in the air, but the N.A.T.O. forces occupy a line from the North Cape in Norway to Asia Minor and the Levant—a matter of 4,000 miles. In the event of hostilities this line must be kept reinforced and supplied and the only way to do this is by sea. No longer are the focal points and terminal ports of the sea communications concentrated round the coasts of the British Isles, but they are spread through western Europe and into the Mediterranean to the Ægean. The problem therefore is one of greater magnitude than it was in World War II.

To threaten the Allied control of the sea communications Russia has at her disposal a strong force of cruisers of the latest design and a submarine strength of some 350 craft, of which about half are of the ocean-going type (Germany started with 57 of all types in 1939). In addition the latest estimate of her air strength is in the region of 20,000 aircraft, and it is only reasonable to expect that a considerable proportion of these will be available for the attack on Allied shipping.

PRINCIPLES OF CONVOY PROTECTION

History has proved that there are certain immutable principles which prove effective in the protection of ships at sea. They are "distant cover" and "close escort". By distant cover is meant the destruction in their bases of any menaces to the sea communications and the interposition of forces capable of dealing with any that may get to sea before they can get near the ocean

[Admiralty Photograph

"*Convoy forming up.*"

routes. To quote examples of this it is only necessary to refer to the two recent world wars where we see in the first case a considerable naval force based in Scotland and the Orkneys which prevented the German Fleet from breaking out of the North Sea, and in World War II this was re-inforced, when the coasts of France were occupied by the Germans, by special "hunting forces" composed of ships and aircraft whose duty it was to stop not only submarines but also aircraft from attacking our ships in the Atlantic. No matter how numerous or efficient the sea and air forces employed on this duty of distant cover, it is only right to expect that sea and air raiders will get through. To deal with them it is essential that "close escort" is provided for the ships at sea. The forces given this task must be capable of dealing with any raiders that make their appearance whether they be surface, submarine or air.

CONVOYS

It is manifestly impossible to provide a sufficient escort for every ship that sails the sea, so it has been the practice to form ships into convoys. This enables an escort of reasonable strength to be provided, and naturally the composition of this will depend on the voyage the convoy is undertaking. Coastwise convoys which come under an "air umbrella" provided by shore-based aircraft will only require light surface forces, but on the other hand ocean convoys must be provided with escorting ships capable of dealing *on their own and instantly* with any form of menace that may appear, whether it be on, under or over the surface. Thus in the last war it was the custom to include in the escort of the latter, battleships, cruisers, destroyers, frigates and escort carriers. When these convoys were within range of Allied shore-based aircraft these also joined the escort and played their part.

What does a convoy look like at sea? Generally it is a collection of stolid, trudging merchant ships, some old, some new, some slow and some not so slow, covering many square miles of ocean. It is only the fast troop convoys that get a speed of advance much over 10 knots. Any form of raider whether surface, submarine or air always has superior speed—a great advantage. This speed factor will hold good in any future war, as high speed at sea, as far as the carriage of cargo is concerned, is an uneconomical proposition from the point of view of the shipowner. But the fact that the convoy is an organized body and the escort commander is in constant touch with the controlling authority ashore enables evasive routing to be carried out if and when enemy forces are located. Further, ships' hulls only occupy 2 per cent of the area of water occupied by a convoy in normal cruising formation.

With the long-endurance, high-speed aircraft and submarines in the possession of our potential enemies it is clear that in any future war every convoy that crosses the Atlantic will have to fight its way through.

DISTANT COVER

As in World War II, the distant cover for the North Atlantic trade routes in any future war will have to be provided by surface ships and aircraft. They will have to be disposed so that they can intercept any enemy raiders on passage. But there is in this a very important role for Allied air forces. They can be directed on enemy naval bases in the hope that this form of offensive will result in the destruction of enemy raiders before ever they put to sea. Also the aircraft based behind the "thin shield" of the N.A.T.O. forces may be in a position to intercept enemy aircraft on the way to their hunting grounds.

[Admiralty Photograph

"ON WINTER CONVOY"
The Destroyer drops a depth charge.

This is really applying the principle of defence in depth to a maritime problem. As long as the "thin shield" holds this should be a help.

CLOSE ESCORT

But no matter how effective any form of "distant cover" may be, some raiders are sure to get through. "Close escort" will therefore be essential and by having forces at the decisive point—the convoy—conforms to a well-known principle of war. The escort commander must have under his immediate command forces capable of dealing with any form of raider. He must be able "to locate and report, attack and destroy" any enemy he may encounter. Radar is a great assistance in the problem of location and it has been stated that, with the present state of efficiency of this device, it is now possible to get aircraft into the air in time to intercept any enemy aircraft that threatens his charge. Asdic can now do the same with submerged submarines, and further by means of an electronic device it gives the range, bearing and depth of the submerged submarine and sets this automatically on the weapons designed for her destruction—the human element is thus to a great extent eradicated.

So much for the weapons available for offensive action against forces that threaten our shipping. But for close escort the question arises what ships are considered necessary. First and foremost comes an escort aircraft carrier. This type of ship is really a self-contained and highly mobile airfield with its aircraft on the spot, fully manned and ready for instant action. The types and numbers of aircraft carried in any carrier depend entirely on what duty it is employed on. It is only too clear that for convoy work one type must be a high performance fighter which can take on any of the high-speed bombers that may appear. Such an aircraft is now making its appearance at sea. Then there is the strike/reconnaissance type. This must have long endurance and room for the crew, their instruments and weapons—bombs and torpedoes. These aircraft form, even on their own, a powerful weapon for use against both surface ships and submarines. Finally it has been observed recently that the Fleet Air Arm are developing helicopters. Their capacity for taking-off and landing on small spaces and also for hovering should make them useful in hunting submarines. They might well be used from merchant ships, but it must always be remembered that at sea a carrier must be available for repairing and servicing them.

Surface ships must also form part of the escort, and whether they be cruisers, destroyers or frigates they must be capable of defending a convoy against submarines and aircraft. This is now an accepted fact as the frigates at present with the Fleet can be divided into two classes—anti-submarine and anti-aircraft.

THE WEATHER FACTOR

Perhaps more than in any other form of warfare the weather at sea plays a great part. Those, both seamen and airmen, who were employed protecting shipping in World War II have very good cause to remember many days and nights spent in appalling conditions on the North Atlantic shipping routes. Howling gales with driving rain and low visibility seemed to be the order of the day. In these conditions the ships in convoy are bound to become scattered and thus spread out, which greatly adds to the difficulties of the escort commander. (This scattering is the best chance for prowling raiders.) Again one can well imagine conditions when the convoy is steaming in good conditions and when shore-based aircraft, which ought to have formed part of the escort, were grounded. So once again there is a strong case for having an escort carrier with every convoy.

NEW WEAPONS

Since World War II new weapons of offence have made their appearance and attained a degree of efficiency which of course will add to the difficulty of protecting ships at sea. First there is the guided missile. This proved itself on one or two occasions when it was used by the Germans. However, this must have a "platform" from which it can be discharged. At sea this must be a ship or aircraft. The escort, if strong enough to be disposed properly, should on the face of it be able to cope with these "platforms" and destroy them before they get into a position to attack. Long-range homing torpedoes using acoustic pistols are also in production—they made their presence felt in the last war, but were largely countered by a device known as a "foxer" on to which they homed and exploded harmlessly.

The atomic and nuclear bomb has never been used in sea warfare up to date. Once again the only means apparent at the moment of getting it near its target is by aircraft, although in narrow waters guns firing atomic missiles might well be encountered. Once again the first line of defence of a convoy is its escorting aircraft. But by its very size and shape a convoy is a very dispersed target and thus attack on it with these rare and expensive weapons becomes probably an uneconomical proposition. That the Admiralty is alive to the potentialities of this form of attack is borne out by the recent statements in the Press that instructions for dealing with it, and particularly the after effects (radioactivity), have been issued to the masters of ships.

CONCLUSION

To sum up, the first fact that stands out quite clearly is that the whole operation of protecting our ships at sea is a matter for all three fighting services acting in close co-operation. The Army will have to see that the points of departure of either raiders or guided missiles are kept as far from our trade routes as possible—this is specially important in the latter case. Then the air forces will have to be keenly alive to the importance of attack on enemy naval bases and at the same time the interception of enemy raiders whether surface or air on passage. The sea forces must have at their disposal the ships and sea-borne aircraft in sufficient numbers to provide really efficient escorts. In this respect the provision of escort carriers seems to be a controlling factor. Whether these should be of the large or small type must be a matter for the naval staffs to decide.

But, if the "thin shield" on the continent of Europe is to be quickly reinforced and properly supplied, the fact remains that sea communications are the only way of doing this. Previously it has been mentioned what this problem involves in this era of N.A.T.O. strength. The writer is quite convinced in his own mind that the matter is receiving the most earnest and careful consideration by the staffs of all three services and that the co-ordination of the defence effort, not only in this country but also among the Allied Powers, is in sound hands.

The views expressed in this Journal are those of the authors, and are not to be construed as official opinions or policies.—
EDITOR.

THE BIG PUNCH

By Group Captain Bruce Robinson, C.B.E., A.F.R.Ae.S.

IN recent issues of Air Power there has been, appropriately enough, a series of articles on the use of air power. These, written by the most distinguished authorities, have made absorbing and thought-provoking reading. They have dealt with the use of the air weapon, the employment of air forces. Opposing schools of thought have struck resounding blows; so keen has been the contest that the reader avidly awaits the "next round." But all the arguments have one point in common, an assumption that air forces capable of developing air power will exist. Certainly they have existed in the past, but is it a safe assumption for the future? It is a matter worth examining.

Of what does an air force capable of developing air power consist? There are surely three essential components, men, machines and morale; all are interacting, and all have to be produced and maintained.

It is possible to draw a comparison between the production and maintenance of machines and of men for a fighting Service. First, the machines. From time to time concern is expressed in Parliament and the Press over the length of time that elapses between the design of a new type of aircraft and its issue to squadrons. Probably one of the greatest advances which could be made would be a considerable reduction in the present gestation period. But the secret eludes the technicians of all nations, and the figure stands at something of the order of five years, though a recent announcement shows that the Ministry of Supply hope to knock a year off by speeding up flying trials. By and large the R.A.F. can reasonably depend upon having aircraft second to none, and at the right time. History supports this hope, for in the past the timing of the availability of machines of the right calibre has been correct—though the Hurricanes and Spitfires of 1940 ran it a bit close—and there is no reason to suppose the timing will be any worse than before. Indeed it should be better, with the Western World keeping, as it is, alive the realities and aware of its responsibilities. Allied to the machines is linked the requirement for the technical "know-how" for their most effective employment, and all the related techniques and logistical support essential to a modern air force. On these, too, the R.A.F. can surely count.

Now for the other half of the picture—the men. In the past, over the centuries and up to and including the Second World War, Britain and the Commonwealth has not lacked fighting men. Service in the Armed Forces has been a distinction; a commission, in particular, has been something keenly sought and a source of pride. Service in the ranks too had, pre-war, an attraction and it gave those who served a spirit which is lacking today. The British Commonwealth still possesses the raw materials, but the ability to fashion them into a stable fighting force of high morale seems lost. It has been lost in the social revolution which has occurred in the past twenty years. It is in this fact that the main threat to our future air power lies. Unless the implications of this revolution are appreciated and catered for, the correct resolution of the arguments on the proper use of air power, and the production of the finest aircraft and operational techniques will be as nought. For the lynch-pin, efficient men with high morale, will be missing.

Why does the Service fail to attract and hold the men it needs? No longer does the spur for travel and adventure, comradeship and a full life act as the powerful magnet. It has been said that the four main desires of men are distinction, adventure, economic security and sex; they vary with individuals, and it is a question of priorities. Today it is security which tops the bill, whether we like it or not. Two world wars in forty years are having their effect. Parents think of security; so do the young. This is a natural outcome of the war years; large numbers of young men today can look back only on unsettlement and insecurity, evacuation, separation—now they want the opposite, stability and roots. Pre-1939 or pre-1914, the nation had roots and it was therefore ready for adventure. It is a repetition of the human trait of "wanting what we haven't got, and having got it, not wanting it." Hand in hand with security marches education as a prime factor in the social upheaval of our times. The world has become tremendously education conscious. Witness the quest today for a University degree, almost a *sine qua non* for a successful career. The man who twenty years ago was happy to serve in the ranks, no longer is; he must go to Oxford—or at any rate his son must. Add to these basic ingredients the pressing demand for an ever higher standard of living, and the possession of such outward expressions of it as motor cars and TV, and the mixture from which an efficient fighting force must be distilled is revealed as a volatile one. The distillation process is indeed a difficult and expensive one, far more difficult than the production of the machines.

Recital of these factors amounts, admittedly, merely to a blinding glimpse of the obvious and a set of circumstances well understood by the Service Ministries, if less so by the Treasury. The R.A.F., in particular, has acknowledged the changed circumstances, and much has been done in an endeavour to meet the challenge which the social revolution means to its very existence. Long Service careers to the age of fifty-five are now offered; there are better opportunities for advancement; married quarters are widely provided; there are aircrew pay, re-engagement bounties, and improved pensions (including widows' pensions). All sorts of devices and inducements are discussed and some given effect—smarter uniforms, better conditions in barracks, buttons which need no polishing, etc. But still the Service has failed to attract and hold the men it wants. The improved pay and conditions of service announced in March this year are proof of the gravity of the situation. Time alone will show the effect of this latest step, but it is certain that it is *not* the sole panacea of the Service's trouble.

The fact is that all these measures, even in the aggregate, do not amount to the "Big Punch" which the Service needs to apply if it is going to stay in the market in the world of today and tomorrow, the world of the Twentieth-Century Social Revolution.

The "Big Punch" must so shape conditions of service, be it commissioned or in the ranks, that a Service career can compare favourably with a career in commerce or industry. It must compare in two respects: first, the pay prospects must be attractive, and secondly, a Regular must be able to count on his ability to bring up and educate a family in conditions in which it will not be at a disadvantage compared with the civilian's. In short, the Service must offer sufficient inducement to ensure attracting the right quality, and it must, for all Regulars, pay homage to this demand for greater security. Pay and the family are the keys to the manpower problem; the two are inter-connected, and of the two the family is the master-key.

As regards pay, no parents or young man expects a high rate of pay in junior ranks. It is important, however, that pay, even in the junior ranks, should be sufficient to enable a full life to be led so that the Service may get back to its earlier status of a *corps d'élite*. Beyond this, parents, and the outstanding young man, must be able to see the opportunity of a career leading to emoluments later in life which will compare with those obtainable by the outstanding man who goes from university to commerce or industry. The Service man today, officer or airman, can have little complaint with rates of pay, provided he has no family responsibilities. The crux of the manning problem lies in adjusting conditions of Service for the family man. It is here that the "Big Punch" is needed and it should be shaped, not by rank, but by consideration of family responsibilities.

If, then, the aim of the "Big Punch" be determined as the need to guarantee to the long-term Regular the ability to bring up and educate a family, its content becomes clear. It must contain five major features. Firstly a more lasting benefit than the £100 bounty must be offered to those medium-service men whom the Service wishes to sign on for long service. The extra benefit could take the form of eligibility for a family education allowance, as recently debated in the House of Lords. All Service personnel, officers and other ranks, must, if their children are not to suffer in comparison with those of the civilians who "stay put," be able to send their children to boarding schools for the approximate period when they are aged eleven to seventeen years. This is not financially "on" today, and it is a vital deficiency. The suggested education allowance should not be a cash allowance, but be paid to the school; it could be a flat rate for all ranks, the individual making up the total fees to an extent within his means. Alternatively, perhaps, the long-term Regular could be assured of a place for his children (for the essential boarding-age period mentioned) in "Air Ministry schools." Why not some first-class boarding schools for officers' and other ranks' children?

Secondly, the question of housing. Nothing has done more to improve morale in recent years than the increasing provision of married quarters. The Regular, irrespective of rank, should be guaranteed one wherever he goes. It follows that a necessary extra inducement for the man who "signs on" should be that he would qualify, on signing, for a substantial bonus of "points" to raise him up the list to a point which would ensure his qualifying for a married quarter. It also follows that the drive to build married quarters must continue. As an insurance against over-providing, a proportion could perhaps be sited in the local towns, so that the Air Ministry could let to civilians if not required for Service personnel at any time.

The third major feature of the "Big Punch" relates also to housing, but in the later stages of a career, and is linked to retirement. Every long-term Regular (and this phrase may be taken to include officers completing more than, say, twenty-two years' service—though the proposal is mainly, perhaps, applicable to other ranks) should, as far as is practicable, be able to obtain a posting to his selected retiring area for his last three years. Then, too, the Air Ministry should, some years earlier, assist him to buy, or build, a house, advancing say (against security of his pension) up to 25 to 30 per cent. of the cost price, thus enabling the individual to raise the rest by mortgage. Consider the effect on recruiting if the R.A.F. were able to advertise "Join the R.A.F. and own your own house."

The fourth major point in the "Big Punch" relates to turbulence. By hook or by crook the married Regular should, while his family are in the critical schooling period, be able to count on staying three years in a post. Not only would this add tremendously to the marrieds' morale, but it would be highly beneficial to units' efficiency. From station commanders downwards, individuals would know they had a chance to create something and see the fruits of their labours—and this includes accepting responsibility for results, good or bad.

The proposed improvements in conditions of service would have a cumulative recruiting effect. In themselves, the effect would be electrifying and transform the whole picture. But in addition there would be a contented Regular cadre, and there is no better recruiter than the contented man whose morale and pride of Service are high.

An attempt has been made to state the root cause of the Service's problem, and a way of solving it has been sketched. It remains to consider whether the solution is practicable and whether it is, in fact, a desirable one. The answer as to practicability lies, it is suggested, in one word, *quality*. This was the watchword in the past; let us return to the old principle of the "small but good." Cut the number of squadrons, cut the amounts allocated to machines (and allied services), and allocate more instead to the men. In short, cut the pack again and adjust the share-out between men and machines, so that the men of right calibre will be there in the right number. Maybe the R.A.F. would have to be *very* small, but quality, not quantity, is the surest rock on which to build, or expand a building. "How small?" is the question, and this could perhaps only be answered after prolonged and detailed study *de novo* by a full-time "Size and Shape of the Air Force" Planning Committee.

As to the desirability of the "Big Punch," some may hold that such concentration on security and materialism signifies the death-knell of the R.A.F. They may ask: "Where is the spirit of youth, of adventure, the devotion to duty, the readiness for sacrifice and unselfishness taught by 'the few' and the earlier builders of our Service?" Is not the answer that the "Big Punch" aims to strengthen the middle ranks, to eliminate the present crumbling structure and so renew it that it could support, without the present fatiguing stress, the fine composite structure of youth and maturity which a fighting Service requires? Only when minds are free can they give their all; only then do spirits soar.

And so to the fifth and last component of the "Big Punch," and the most vital one. Components one to four are designed to strengthen and rejuvenate the Service in the material sense. They constitute, in fact, an earthy, materialistic and costly manure to fertilize the ground so that the seed of the spirit of service can once again be cultivated and flourish. The spirit of service demands acceptance of the Christian life. The fifth component is, therefore, in one word, God. Thus revitalized and inspired, the Service could rightly be termed a *corps d'élite* and play its part in a national renaissance, which the whole Christian world so urgently needs. Such a revival would, incidentally, be the strongest weapon we could forge for war, be it cold or hot. Viewed this way, the "Big Punch" is cheap at the price.

MASS DESTRUCTION BY FISSION AND FUSION

By Wing Commander R. McMillan, C.D., B.Sc., M.Sc.,
Royal Canadian Air Force

WHEN Hiroshima and Nagasaki were vaporized by the heat of the first atomic bombs in 1945, some people believed that we had produced the ultimate weapon of mass destruction. Yet seven years later the first hydrogen bomb completely obliterated the test island in the Eniwetok Atoll and tore a crater in the ocean floor 175 feet deep and a full mile in diameter. This explosion blanketed an area of 300 square miles—an area the size of New York city. The vast power of the second hydrogen bomb, detonated just seven months ago, surprised even the scientists. Its effective incendiary area, if exploded over a densely populated country, was estimated to be 1,960 square miles—three times the area of greater London. But the destructive power of this bomb did not end even there. A Japanese fishing vessel, 70 miles away at the time of the explosion, was so contaminated by radioactivity as to become uninhabitable by humans.

The widespread publicity given to these events by the press and radio has made people curious about atomic energy. They want to know what atomic energy is, how it is unlocked, and why uranium and hydrogen have been picked as the agents of destruction. Although I am going to answer these questions, I want to make it quite clear that what I am going to say is merely the comment of an interested engineer. I do not know how to make atomic bombs, but there are certain laws of physics which rule some things out as impossible and make others seem probable.

ATOMIC STRUCTURE

Up to now, scientists have isolated 100 elements—pure substances which cannot be converted by chemical means into other pure substances. Not all of these elements occur in nature, so that some of them have had to be produced synthetically in the great research laboratories of the world. Because hydrogen is the lightest element, it is called element number one. Element number 100, the heaviest substance known to man, was discovered on the 1st March, 1954, and is therefore so new that it has not yet been named. Other than hydrogen, the elements in which we are most interested are uranium—number 92 and plutonium—number 93. Our interest in uranium stems from the fact that it is the heaviest element found in the earth's crust. Plutonium is a by-product of the uranium refinement process and is slightly heavier than its partner. The location of hydrogen at one end of the weight scale and uranium and plutonium near the other has an important bearing on their selection for the construction of atomic bombs.

All of the elements are made up of tiny particles called atoms. For many years physicists have been putting forward theories purporting to describe the structure of atoms. The most commonly accepted theory visualizes atomic structure as analogous to our solar system. At the centre of the atom is the nucleus (sun) around which rotate electrons (planets) in orbital paths. These planetary electrons are tiny particles moving at high speed and carrying a negative charge of electricity. In the nucleus are protons carrying positive charges, which attract the electrons in the same way as the sun attracts the planets. In 1932 physicists discovered another inhabitant of the nucleus. the neutron, which is about the same weight as the proton, but is electrically neutral. In fact, the discovery of the neutron was delayed because it is an uncharged particle and therefore difficult to detect. If the neutron had not been found, the atomic bomb would not have been conceived, for, as we shall see, it is the spark plug of atomic energy.

The nucleus of the hydrogen atom has a very simple structure consisting of one proton and no neutrons. In the uranium nucleus there are 92 protons and 143 neutrons. Most of us have heard about U235; we can now guess that U means uranium and that 235 is the sum of protons and neutrons in the necleus. It follows logically that hydrogen can be designated H1.

Sometimes we can add neutrons to atoms. For example, if one neutron is added to the hydrogen atom we get deuterium—H2. If still another neutron is added, we get tritium—H3. Such variants of elements are called isotopes. There are at least three isotopes of uranium : U234, U235 and U238. H2 and U235 are the star performers in the atomic theatre.

ATOMIC ENERGY

As children, most of us handled magnets. We found that like poles repelled each other and unlike poles attracted. Repulsion is not only a characteristic of like magnetic fields but also a characteristic of the electrical fields about the protons in nuclei. All atoms, except hydrogen, have more than one proton in their nuclei. These protons ought to repel each other and fly apart, but scientists know that they are closely bound together. No one knows exactly what kind of energy binds them, but it has come to be called " binding energy." This " binding energy " is known by different names—commonly atomic energy—but more precisely, nuclear energy (energy of the nucleus).

Atomic research has revealed that the " binding energy " is greatest for elements at opposite ends of the weight scale and least for elements near the middle. For example, hydrogen and uranium have more " binding energy " than nickel or copper, which are intermediate elements. If, therefore, we can smash uranium atoms or unite hydrogen atoms to form intermediate elements, we will get a release of energy. This is, in fact, what is done in the uranium and hydrogen bombs.

Most of us were taught that matter can be neither created nor destroyed. In particular, we learned that if a pellet of lead is cut into two parts, the sum of the weights of the parts will be equal to the weight of the whole. However, with the coming of sub-atomic physics we have learned that if an atom of uranium is smashed and the parts rearrange themselves into two other elements, the sum of the weights of these elements will be less than the weight of the original uranium atom. Similarly, if four atoms of hydrogen are smashed and the parts rearrange themselves into one atom of helium, this atom will weigh less than the four hydrogen atoms together.

From these facts we are led to assume that the release of "binding energy" is connected with a "disappearance" of mass. Einstein predicted just such a connection 35 years before the first atomic bomb was conceived, when he enunciated his mass-energy theory. The theory states that energy is equal to the product of mass and the velocity of light squared, or more briefly—E equals mC^2. This is an amazing equation for two reasons. First, it says in effect that energy is mass and that mass is energy. Secondly, owing to the magnitude of the term C^2 (10^{18} ft./sec. approx.), it is apparent that a small change in mass will result in a very large change in energy. For example, the consumption of 1/1000th of a pound of uranium will release 30 million million foot pounds of energy. Having done this sum, it is easy to believe that one pound of uranium could provide enough power to drive an aeroplane around the world, or propel a submerged submarine a distance of 16,000 miles.

UNLOCKING THE ENERGY

If we smash a uranium atom into bits and these combine to form lighter elements, the process is called fission. Fission was discovered just 15 years ago. The process is analogous to the fission of a drop of water. Suppose a water drop is struck by a particle moving at high speed. On impact the drop begins to take the shape of a dumb-bell . Then the two bulbs of the dumb-bell become more spherical and finally separate. After separation, the two droplets assume the shape of spheres due to surface tension. This is a crude description of nuclear fission.

More precisely, a free neutron, travelling at the speed of light, slams into nucleus of a uranium or plutonium atom. The nucleus is deformed and breaks up into two parts propelled in opposite directions. The two parts rearrange themselves into other elements and, in so doing, eject, amongst other things, surplus neutrons. The fission is accompanied by the transformation of mass into energy.

Fusion is the antithesis of fission. If we can force hydrogen atoms to combine to form heavier atoms, such as helium, the process is called fusion. Fusion of hydrogen is a far older story than the fission of uranium—it dates back to 1930 when astronomers learned by spectroscopic analysis that the sun was fusing hydrogen into helium continuously. Their theory is that all suns start as a huge mass of hydrogen. The hydrogen fuses into helium, which in turn, fuses into still heavier atoms. Gradually, over a period of millions of years, heavier and heavier elements are formed until the sun becomes an inert mass, like a large moon, giving neither heat nor light.

Fusion of the hydrogen in the sun takes place at a temperature of 20 million degrees Centigrade. Up to 1942 it was not considered possible to produce such a temperature on the earth and therefore there was no hope of fusing hydrogen. However, during fission bomb tests just after the war, it was discovered that plutonium, when exploded, produced a temperature of 50 million degrees Centigrade for one millionth of a second. In that instant, scientists saw the possibility of using hydrogen, as well as uranium and plutonium, in the construction of atomic bombs.

FISSION BOMBS

The generally accepted description of the Hiroshima bomb is that it weighed about 10,000 pounds and contained two masses of U235 which were isolated from each other until detonation. As we shall see, each mass of U235 had to be limited to a certain size—probably 30 to 40 pounds.

One of the characteristics of a mass of U235 is that it contains a number of free neutrons. These are darting about in all directions at a speed equal to the speed of light. Two things can happen: they can escape without bumping into anything, or they can strike uranium nuclei causing fission and in so doing liberate more neutrons. The size of the uranium mass has an important bearing on what happens to the neutrons. If we have too little uranium, the neutrons will escape faster than they are produced. If we have too much uranium, there will be more neutrons than are required to support fission and we shall get a tremendously fast chain reaction, ending in a fantastic explosion. Therefore, the fission bomb must contain the right masses of uranium to ensure that neutrons escape at the same rate as they are being produced. Such a mass of fissionable material is said to be of "critical size".

The destructive force of a fission bomb is a function of the rate of fission. For example, if the explosion requires one second to reach its peak, it will cause less destruction than if the reaction time is one tenth of a second. The ability of a system to maintain fission is defined as "reproduction factor". If for example, a particular reaction starts with 400 neutrons and one generation later there are 600, the reproduction factor is 600/400 or 1.5. Obviously the reproduction factor has to be greater than 1 to cause an explosion and the greater it is the quicker the explosion will occur. The fission bombs being produced at the present time probably have a reproduction factor of 2.

The generally accepted description of fission bombs can be summed up briefly as follows. They are about 18 feet long and some 24 to 30 inches in diameter. They contain separated cores of U235 or plutonium. These cores are of sub-critical size and have a reproduction factor, when brought together, of about two. The bombs depend on the rapid production of neutrons to cause fission, which releases huge amounts of energy, mostly as heat. The heat produces expansion waves, causing tremendous damage by blast and incendiary effects.

FUSION BOMBS

There are three important criteria to consider when selecting an element for a fusion bomb. First, the element should be readily available. Second, it should be light in weight. Third, it should show the greatest possible reduction in mass when fused into another element. Of all the elements, hydrogen meets these requirements best.

As we have said, H1 has one proton, H2 has one proton plus one neutron, and H3 has one proton and two neutrons, in their nuclei. It is generally agreed that fusion bombs, when exploded, convert one, or a combination, of these isotopes into helium. The helium nucleus contains two protons and two neutrons. Therefore, we can see that H1 will not do, because it contains no neutrons. However, either H2 or H3 can be fused into helium, and in the case of H3 there would be two free neutrons ejected to produce heat and keep the fusion going. From this analysis we can conclude that H3 is better than H2 for the construction of a fusion bomb.

However, there is a grave difficulty about H3. It does not occur in nature and it is almost impossible to produce it synthetically in large enough quantities to construct bombs. At present, H3 is produced in an atomic pile, but even so, the yield is very small.

From this reasoning, it is a fair assumption that the first fusion bomb built was made of H2. This bomb was exploded on the Marshall Islands on 1st November, 1952. It produced a blast equivalent to 5 million tons of T.N.T. The second bomb was exploded on 1st March, 1954. Its blast was equivalent to 12 to 14 million tons of T.N.T. This increase in blast effect was probably achieved by mixing a small amount of H3 with the H2.

We mentioned earlier that hydrogen fuses into helium at a very high temperature, and that such a temperature can be produced by a fission bomb. It follows that fusion bombs must contain some form of fission bomb—probably plutonium. It is conceivable therefore, that the United States might use its stock-pile of fission bombs to build fusion bombs. It is also interesting to note that, of necessity, the invention of the atomic bomb had to precede the invention of the hydrogen bomb.

ADVANTAGES OF FUSION BOMBS

The fusion of deuterium into helium is accompanied by a greater "loss" of mass than is the fission of uranium or plutonium. It therefore follows, from Einstein's equation that the hydrogen bomb will be more powerful, pound for pound of explosive, than the atomic bomb. In fact, it has been calculated by an eminent English physicist that it could be eight times as powerful.

The other advantage of the hydrogen bomb is that it is not limited to size. Probably its only limitation will be the size of the bomb bay in the aeroplane carrying it. The atomic bomb is limited, as we have seen, by the critical size of the uranium or plutonium. This means, of course, that the hydrogen bomb will be more powerful. The following table shows the comparative blast strengths of fission and fusion bombs.

FISSION AND FUSION BOMB DATA

Serial No.	Date (*a*)	Place (*b*)	Bomb (*c*)	Type of reaction (*d*)	Estimated energy (tons T.N.T.) (*e*)	Estimated area of complete destruction (sq. miles) (*f*)	Remarks (*g*)
1	6 Aug. 45	Hiroshima	U235	fission	20,000	4.0	—
2	9 Aug. 45	Nagasaki	U239	fission	27,500	1.5	Damage restricted by valley
3	Apr. 51	Marshall Islands	U235 and U239	fission	50,000	5.5	Exact date not available
4	1 Nov. 52	Marshall Islands	H2	fusion	5,000,000	21.0	—
5	1 Mar. 54	Marshall Islands	H2 and H3	fusion	13,000,000	50.0	—

CONTRIBUTORS PLEASE NOTE!

Owing to the Christmas Holidays and greatly increased volume of printing at the end of the year, articles for inclusion in our January number must reach the Editor NOT LATER THAN:—

(i) *From Serving Personnel* (to allow submission by the Editor to the Air Ministry for official permission to publish) by first post on Friday, 22nd October, 1954.

(ii) *Other contributors* by first post on Friday, 29th October, 1954.

Articles should be addressed to:—

The Editor of Air Power,
Chaseley, South Cliff, Eastbourne.

To assist in planning the lay-out of the Journal they should be as nearly as possible 1,200 words (two pages), 2,500 words (four pages), and must not exceed 4,000 words.

THE TURKISH AIR FORCE

By M. J. Hardy

THERE is an old Turkish proverb which says " The bear knows nine songs, and all of them about honey." As the Easternmost member of N.A.T.O., as the possessor of 400 miles of frontier with Transcaucasian Russia and Communist Bulgaria, and as a potential base of great value for attacking targets in the southern part of the U.S.S.R., should that country venture into aggression, Turkey is of great strategic importance to the free world. No love has been lost between Turkey and Russia for many, many years, and for this reason Turkey will know exactly what value to place upon any honeyed songs that the Russian bear may make by diplomatic means. Several recent events have focused attention upon the Balkan states, especially the defensive alliance recently formed between Yugoslavia, Greece and Turkey—a Communist dictatorship, a monarchy and a republic respectively. This alliance between three states of such varied political complexions is in itself clear proof of that deep suspicion of Russia which is shared by free nations in general, and those of South-East Europe in particular.

Two events of more immediate aeronautical interest have focused attention upon Turkey and her air strength. These are the impending release of 82 of the Royal Canadian Air Force's North American Sabre 4-F.B jet fighters to the Turkish Air Force (Greece is also to receive 82) as the R.C.A.F. in Europe replaces these with Orenda-engined Sabre 5-F.B. fighters of higher performance. Also, there is the tour of six Bomber Command Canberra B.2s of No. 27 Squadron, under the command of Air Vice-Marshal J. R. Whitley, C.B., C.B.E., D.S.O., A.F.C., through Southern Europe and the Mediterranean, calling at Athens, Istanbul and Belgrade, amongst other places. This event will be very useful, both as a goodwill tour and as an exercise in high speed reinforcement, and it may possibly result in further orders for Canberras—especially from Turkey, which needs a good modern jet bomber perhaps more than any other type. Both these events indicate that now that the more urgent requirement of building up Western Europe's air power has been to a great extent fulfilled, more attention can be and is being paid to the air defence of South-East Europe. In particular, the 82 Sabres which Turkey will receive under Mutual Aid will be very valuable in supplementing the Republic F-84E Thunderjets supplied in 1952, and which at present form the spearhead of Turkish air defence.

It is significant that the Standing Group of N.A.T.O. recommended Greece and Turkey as the first N.A.T.O. powers to receive European-based R.C.A.F. Sabres, as Greece, Turkey and Yugoslavia all lack modern jet fighters capable of meeting the MiG-15 on equal terms. With a first-class, up-to-date, " all swept " fighter in service—deliveries of the first 27 are expected to be completed this autumn—Turkey will be able to contemplate her air defence problems with still more confidence.

So far U.S. aid to Turkey has totalled about $1,300,000,000 (more than £464,000,000), three-quarters of which has been for military purposes, and the rest for economic development. Since 82 per cent of the Turkish population are agricultural workers, it is understandable that a domestic aircraft industry of any size is impracticable, especially with Turkey's primitive roads. Now that this latter fault has largely been rectified, Turkey will steadily become more industrialized, and exploitation of her natural resources, especially coal, iron, tungsten, chromium, lead, zinc, copper, antimony and cobalt, can proceed. Development of this natural wealth will gradually hasten the growth of Turkey's aircraft industry from its present rather small size; at the same time it will lessen those problems inherent in the air defence of relatively undeveloped countries, namely lack of suitable aerodromes, skilled labour, up-to-date equipment and—most important of all—money.

But these problems have never prevented Turkey from maintaining an air force which, although naturally small, was always of good quality, both as regards personnel and aircraft. This was undoubtedly largely due to Turkey's partiality for British aircraft and British methods of training. Although an integral part of the Turkish Army, the air force remained as well balanced as any in Europe and its needs were never totally subordinated to army requirements.

By 1948, Republic Thunderbolt single-seat day fighters and Northrop Black Widow 3-seat night fighters joined Turkey's Spitfires; Douglas Invaders and D. H. Mosquito T.3s were used as bombers, and a further 135 Mosquito F.B.6s were supplied, fitted with 4-blade D.H. airscrews instead of the usual 3-blade type. The need for a modern torpedo-bomber—a type in which Turkey had hitherto been lacking—was filled by another Bristol product, the well-proved Beaufighter T.F.10. Dakota and Expediter transports replaced the obsolete Savoia-Marchettis, and training needs were met by Harvards, Magisters, Masters and Beech AT-11 Kansans. Airspeed Oxfords went into use as ambulances, and the war-supplied Spitfire Vs were turned over to training duties. During 1949, an order for 105 Piper L-18 training and liaison monoplanes was placed for Turkey by the U.S.A.F. Later on, Lockheed T-33 jet trainers and Republic Thunderjets were supplied under M.D.A.P.

At about this time the Turkish Air Force became an independent service, and with Turkey's participation in the North Atlantic Treaty Organization came an increasing reliance on U.S. equipment. However, demonstration flights of a Percival Provost basic trainer in Turkey last July, and the Canberras' visit, will ensure that this matter is not entirely lost to British manufacturers. At present, about 95 per cent of Turkey's armed forces are at N.A.T.O.'s disposal, and Allied Air Forces Southern Europe, under Lieutenant-General Craigie, U.S.A.F., includes the air forces of Turkey, Greece, Portugal and Italy. A subordinate command of "Comairsouth" is the 6th Allied Tactical Air Force, established on 14th October, 1953, with its H.Q. at Izmir, Turkey. This force, commanded by Major-General R. E. L. Easton, U.S.A.F., provides tactical support for Allied Land Forces South-Eastern Europe, and its operations are co-ordinated with other N.A.T.O. commands, and with Greece and Turkey. Turkish pilots are trained in N.A.T.O. schools in Canada and the U.S.A., besides their own country and this is but one example of how closely Turkish forces are integrated into N.A.T.O. £24,390,000 (of which £4,430,000 is supplied by Turkey) is being spent on building military airfields, communications facilities, fuel storage depots, oil pipelines and military headquarters. A new airfield, Esenboga, near Ankara, was finished in September, and nine others are being reconstructed and expanded.

Thus it can be seen that Turkey's air defences are accorded the importance due to a country standing between Russia and the oilfields of Arabia and

A group of Turkish jet pilots.

Persia. At present, there is, as previously mentioned, a lack of a fast medium-range jet bomber such as the Canberra to provide a means of striking back at such centres of industry as Baku, Batum, Sevastopol and Odessa, to name but a few of those places which Russian aggression would lay open to attack. This task might, of course, be fulfilled by Thunderjets carrying atom bombs, or, as a more satisfactory alternative, by a force of B-47 Stratojets, or perhaps of " V "-class bombers, based in Turkey. These would constitute a powerful deterrent, especially as most of Russia west of the Urals, and much of Asiatic Russia, too, would come within their range. But come what may, Turkey's Air Force can be relied upon to play a very effective part if World War III occurs.

The views expressed in this Journal are those of the authors, and are not to be construed as official opinions or policies.—
EDITOR.

THE AIR FORCES IN PARLIAMENT

(*This article was completed on* 9*th August*, 1954)

THE SUEZ CANAL ZONE BASE

ON 29th July, 1954, the Secretary of State for War (Mr. Antony Head) opened a debate in the House of Commons on the proposed Anglo-Egyptian Agreement, the Heads of which he had initialed, on behalf of Her Majesty's Government, in Cairo only two days previously. This agreement is a matter of the greatest strategic importance, involving as it does the evacuation of all British troops from the Canal Zone, including of course the air component.

Before considering Mr. Head's statesmanlike explanation, it will be well to examine broadly the accepted principles and main details of the proposed agreement, which has yet to be negotiated and ratified by the two governments concerned. The proposed agreement will provide for a complete withdrawal of British forces from the Canal Zone within twenty months from the date on which it is signed. The period of the agreement is to be for seven years from the date of signature ; and during the last year of its currency the two governments are to discuss arrangements for the period immediately following its expiry.

Though all of the troops and some of the stores are to be removed, parts of the Base are to be maintained in readiness for immediate re-activation and use in the event of an armed attack by an outside Power upon Egypt, or upon any country which is a party to the treaty of joint defence between the Arab League States, *or upon Turkey*. In any such event, Egypt is to afford to the United Kingdom the facilities necessary to place the Base on a war footing and to operate it effectively. If an attack on any of these countries appears to be threatened, the two governments will immediately consult together. Egypt is also to afford overflying, landing and servicing facilities for *notified* flights by aircraft under R.A.F. control ; and both parties are to uphold the Suez Canal Convention of 1888, whereby freedom of navigation in and through the Canal is guaranteed to all nations. During and after the evacuation, the Egyptian Government is to be responsible for the security of the Base ; the British Government is to enjoy the right to maintain, with civilian personnel, certain military installations in the Canal Zone (for which purpose they may employ British or Egyptian contractors) and also the right to inspect these installations from time to time; and the Egyptian Government is to take over and maintain other existing installations, e.g., communications, bridges, pipelines, public utilities, wharves, etc.

The Secretary of State for War said that the proposed agreement must be judged in the light of strategic facts. Our policy in Egypt, now and in the near future, depended on three considerations. The first was that the use of the hydrogen bomb and other thermo-nuclear weapons (which, in the event of another major war, was certainly to be anticipated) would seriously restrict our ability to mobilize, equip and despatch overseas large numbers of troops and to maintain them in large bases a long way from home. As *The Times* expressed it, "the hydrogen bomb has . . . made the old policy of a single large base out of date." The same restriction would apply to Russia, if she tried to maintain, in the Middle East, large forces which would have to be supplied by long lines of communication running through mountainous country (e.g. Persia).

The second consideration was Turkey's entry into N.A.T.O. and her rapid progress, with American help, in building up her defence forces. This increases the likelihood of British troops being able to take part in a more forward strategy on Turkey's right flank in defence of the Middle East. In these circumstances, the Base in Egypt would be much farther away from the theatre of operations than it would be if the defence of the Middle East were to be carried on according to existing plans.

The third consideration was that our armed forces are seriously over-stretched and over-strained and that we have, at present, no strategic reserve—a very serious situation at any time and particularly if a war were to break out. The release of about 80,000 troops from garrison duty in the Canal Zone would enable us to build up a strategic reserve, partly at home and partly at some other conveniently situated base or bases. (Cyprus is one of these.)

By no means the least important considerations is the fact that some agreement is necessary. To maintain any longer a base on the territory of an unfriendly nation, against the wishes of that nation, would be the worst of bad policy. Its defence alone would be very costly and always uncertain. Far better to come to an agreement with the Egyptians; so that the continued existence of the Base in peace, and its re-activation on the outbreak of war, or even if war threatens, would be acceptable and advantageous to both parties.

Criticism of the proposed agreement resolved itself into two main objections: some said that it should have been made years ago, others that it should not be made at all. As these two objections may be taken as cancelling each other, they need not be further considered. Doubts were suggested, during the debate, of the future good faith of the Egyptians. These doubts were unwise and unjustified. Our relations with the Egyptian Government have been strained for some time; and some of that Government's declarations and actions may have been, or may appear to have been, unfair to us and disloyal to the Treaty of 1936. But it should be remembered that Egypt has, for the past thirty years or more, been passing through a phase of awakening national self-consciousness and, during the latter half of that period at least, the location of large numbers of British troops on Egyptian soil has, rightly or wrongly, been a serious irritant. With the removal of this irritant and with frank recognition, by the United Kingdom, of Egypt's undoubted right to determine what shall go on within her own borders, there will be every reason to expect that Egypt, no less than any other modern nation-state, will honour her agreements.

In conclusion, we cannot do better than quote, from a leading article in *The Times* of 28th July, 1954, a passage which puts the whole matter in the right light. "The resulting agreement," it says, "is one which both sides can with justice claim to be consistent with their interests and honour. For the Egyptians the essential fact is that after seventy-two years a date is at last fixed on which British troops will leave Egyptian soil. Britain receives in return the assurance that a base by the Suez Canal will continue to exist, that certainly for seven years after evacuation British technicians will be able to superintend its efficiency, and that if during this period an attack is made on any Arab State or Turkey the Base can legally be reoccupied by British troops. An immediate and practical benefit—vital for Middle East defence—is the assurance of staging rights for R.A.F. machines. Equally important is the explicit reaffirmation of the freedom of the Canal."

R. F. P.

GARDEN PARTY AT THE R.A.F. STAFF COLLEGE, BRACKNELL

BY SQUADRON LEADER G. L. PENDRED

[Photo by Corporal R. A. Lawrence, R.A.F. Staff College Unit, Bracknell

A SERIOUS CONVERSATION DURING THE GARDEN PARTY AT THE STAFF COLLEGE, BRACKNELL, ON 12th JUNE, 1954
Left to right: Air Marshal Sir Donald Hardman, K.C.B., O.B.E., D.F.C.; Air Chief Marshal Sir Arthur S. Barratt, K.C.B., C.M.G., M.C.; and Air Marshal Sir Ralph S. Sorley, K.C.B., O.B.E., D.S.C., D.F.C.

THE R.A.F. Staff College Garden Party is fast becoming an annual occasion and indeed a most enjoyable one. This year, members of the Staff and Students of No. 44 Course were looking forward to entertaining their friends in the College grounds, which provide an ideal setting on a summer's afternoon. Alas! June has lately been a sorry month for the sun and 12th June this year, the day chosen for the Garden Party, proved to be no exception; a heavy downpour began in the early morning and continued relentlessly, without hope of reprieve, throughout the day. It was soon obvious that the Party would have to be held under cover or not at all.

The decision to carry on—albeit indoors—proved a popular one and the guests, undaunted by the weather, continued to arrive. Some 360 officers and their friends were welcomed by the Commandant and his wife, Air Vice-Marshal and Mrs. Macfadyen. The 70 official guests included distinguished officers of the three Services, representatives of the Commonwealth armed forces and prominent members of the civilian community. Among those present were Air Chief Marshal Sir Arthur Sanders, Air Chief Marshal Sir

Francis and Lady Fogarty, Air Chief Marshal Sir Arthur and Lady Barratt, Air Marshal Sir Donald and Lady Hardman, Air Marshal Sir Harold and Lady Lydford, Air Marshal Sir Ralph and Lady Sorley, Air Marshal and Mrs. Pike and Sir Arnold and Lady Hall.

It was a great disappointment that the cricket match between the Staff College team and the Adastrians had, perforce, to be cancelled. A tennis exhibition which was to have been given by members of the R.A.F. team suffered a similar fate. However, some amusing entertainment with a distinctly aeronautical flavour was organized inside the College. Perhaps the main attraction was a most ingenious captive flying model depicting Hawker Hunters making " circuits and bumps " on an airfield. The models were driven by compressed air and were ably demonstrated by members of No. 32 M.U., St. Athan, who designed and built them. Many guests, both male and female, tried their skill at piloting the College blind-flying Link Trainer.

A traditional Garden Party tea was served in the College dining room and also in marquees, which had been so cunningly sited that it was possible to reach them dry shod. From a focal position in the middle marquee, the Central Band of the R.A.F., conducted by Wing Commander A. E. Sims, played valiantly.

Despite the efforts of the weather to mar the proceedings, the afternoon must surely be voted a success in that it gave past members of the Staff College an all-too-rare opportunity of renewing old associations, of reminiscing over days gone by, and of meeting those who are currently carrying on the tradition.

IT MAKES YOU THINK

WHAT I say is that people should write less and read more. More good stuff I mean; that's why I'm writing this.

Now just think what drops into your letter-box, your in-tray, your rack in the Mess every day (not including the significant item once per month). The letters, the newspapers, the files: the journals, the pamphlets, the circulars: *Lilliput* and Air Ministry Orders. You, Sir, who are reading for Promotion Exam. B could add to the list. I agree with you, it's enough to send you barmy. Life is too short to read more than a fraction of what one should. It's almost too short to look at what is drawn—except by David Langdon. And as for what is said ... Still, all matters have their priorities and one day, when I have retired from the Service, I'm going to relax and read A.M.Os. really thoroughly. I mean *thoroughly* because they are very carefully written and designed to make you think.

Take A314 to 318 for instance—where I've got to at the moment.

A316—No. 1 R.A.F. Dress—Introduction of Suit and Cap of Improved Material, has an appendix giving Stores Reference, Sizes (extra Short, Short, *Regular*, extra Long, Short Portly, Portly and Long Portly) and the measurements (in inches, it says, unless otherwise stated). From this we deduce, for instance, that neither Long nor Short Portlies can exceed a breast under jacket circumference of 42 millimetres—beg pardon inches, whereas the extra Long can run to a trouser length of 0.35 fathoms together with a waist under jacket accommodation of yard plus or minus 0.1 metre (approx.). All is abundantly clear until one gets to para. 7 which is about extending the issue to *Regular* corporals. Are we to understand from this qualifying clause that a short term corporal of Long Portly proportions can expect no extension of the Order (or of the trousers) in his favour? Maybe this is a thing we shall never know—but it makes you think. Then again, is it to be inferred that a long-service, devoted-to-duty, regular corporal is to be dubbed, lampooned and libelled *irregular* merely because his sartorial measurements in their extremities lie beyond the assumed mean of all corporals, flight sergeants, chief technicians, sergeants and senior technicians in the Service? Perish the thought.

Which brings us back to perishing trousers.

"The present stock of suits and caps consists of those provided for the Coronation and consequently a large proportion is in part-worn condition"—says para. 3—"The used clothing has however been dry-cleaned and only that which is in a fully serviceable condition will be re-issued."

Now, dear readers (if any), I want your opinion. Let us assume for the sake of argument that a fully serviceable trouser is one which is sound in wind and limb, symmetrically bifurcated, with infrastructure intact and opaque to normal wavelengths. You are, shall we say, a Long Portly flight sergeant with an Extra Short pocket whose No. 1 dress is in need of replacement. You therefore opt for part-worn garments at 75 per cent of the unused price, namely five pounds seven shillings and threepence farthing. And what do you find when you get them? It's not a Long Portly at all. It has been dry-cleaned from a 38 x 16 x 33 to a 37 x 35 x 32, which as everybody knows is an extra Long Regular.

Why, dammit, what's the sense of trade test boards if they muck you about like that?

It is obviously going to take more time than I thought to get to the bottoms of these trousers and it's getting a bit dark. Perhaps we had better leave them for the time being and pass on to the next Order. I can't see it very plainly but I think it reads: "Rat Disinfestation: Annual Medical Examination of Officers and Aircrew."

Now that's a thing to make you think, isn't it? If I were a medical board I wouldn't half have fun disinfecting one or two festering...

P.S.—The President said I would have lots of time to study A.M.Os. at the place where they are sending me. I won't even have to wait until my retirement.

H. R. P. P.

EXERCISE "DIVIDEND" AS SOME SAW IT

DIVIDEND," said my youngest, "we do about that at school. Silly name, I call it!" This immediately put the Air Defence Exercise, 1954, into proper perspective, confirmation being provided a few minutes later by the batman who marched in and asked, "What about my 36? The bods in the billet says there's wind of some Exercise."

The Admirable Crichton was quickly assured that his services would not be required, and the C.O. (that's me) and his staff were left pondering how to reconcile the demands of an implacably belligerent Group H.Q. on the one hand with the pacific indifference of three-quarters of the Station on the other. It was clear enough that Higher Authority expected us all to be galvanized into a frenzy of military enthusiasm.

So in due course guards were posted at the approaches to the station, and a number of operationally unemployable airmen were told that they were extra police, given status by means of special armbands, and instructed to look out for suspicious characters. Civilians on flying stations for some reason always tend to look rather improbable, and the Clerk of Works was undoubtedly right when he voiced the opinion that the success of this scheme depended almost entirely on the tolerant good will of the A.M.W.D. and N.A.A.F.I. employees who submitted to frequent arrest and interrogation at the Guard Room.

A plan to make the whole station carry arms was rejected on the grounds that an amateur rather than professional impression might be given, and that the efforts of some members of our community to get their rifles from the trail to a position from which they could salute would introduce an element of low comedy into what ought to be a serious business. Several other measures were discussed, only those being accepted which satisfied the test of appearing really warlike while at the same time causing a minimum of inconvenience—or so it was thought.

Disaster came just one hour before the first dawn, for Master William Brown, son of Flight Lieutenant Brown, chose this of all mornings to be stricken with appendicitis. The distraught father innocently attempted to telephone the local hospital, only to be told that this was forbidden on security grounds. The Exchange was, it seems, sympathetic but adamant; all outside calls had to be authorized. By whom? The C.O., the operator supposed. Shortly afterwards a sleepy and very peeved C.O. had authorized medical comforts for Willie Brown and, at the same time, delegated wide powers to the Security Officer.

Dawn had no sooner broken than the C.O. was on the job again, as his children shook him awake, screaming "The enemy, Dad, the enemy"; and he managed to stumble to the window in time to see two Thunderjets victory roll into the clouds. (I understand that the practical military value of such an attack on a defenceless station at such an hour is still a matter for bitter debate among all the mothers whose children were too young to appreciate the drama of such an awakening.)

An intensely interesting diplomatic and military situation now arose because one of the two Thunderjets suddenly reappeared and landed, and out of it slid an American Captain, who promptly and completely stupefied the duty crew by asking to be gassed up, and where was the club? Since our visitor had just been attacking the airfield with spectacular *élan* and skill, it seemed both unethical and out of keeping with the spirit of the Exercise to provide him with fuel, food and friendship. The Duty Officer therefore impounded the aeroplane, informed the Captain that he was a prisoner and packed him off for interrogation. He took exception to this treatment in the strongest possible transatlantic terms, asserting that he had come from Germany and that, as we were a bombardment outfit—why, we were allies against the British Fighter Command, weren't we? When asked why, if this was so, he had attacked his allies, he shrugged his shoulders and reckoned it was the usual crazy snafu.

A solution was provided by the weather dropping below limits. We were thus able to negotiate an agreement under which we undertook to extend the hand of friendship, while he for his part promised to wait till the weather cleared and in the meanwhile to answer such of the Intelligence Officer's questions as the American Constitution permitted.

With the arrival of normal [*sic*] working hours, events moved very rapidly. By 10.30 the N.A.A.F.I. was beginning to run out of supplies, and the manager came along to say that his van was being held somewhere down the road at the point of the gun because the driver couldn't find his pass. How did he know? Because the driver had told him, of course; he had been ordered by the guard to leave the van and "go and scrounge a pass." There was also a telephone call from the G.P.O. representative to say that if we thought we were controlling outside calls we'd better think again, because what about the three call boxes on the station? He offered to cut these off, but hinted that it might take up to six weeks to reconnect them.

Around mid-morning a loudspeaker announcement abruptly forced "Dividend" proper on the attention. The operational members of the station all cried "Roger D" and splashed their way across to the briefing room, where they were able to listen to the Met. Officer speculating darkly on the unfair and inscrutable habits of all those phenomena which combine to make up the basic data of his esoteric trade. This was one of those rare occasions when all the omens agreed, and it was perfectly obvious that we could safely forget about air warfare for several hours.

Which was just as well, for there were far more pressing matters to hand: the village constable, for instance. He had panted up on his bicycle with the indignant allegation that our guards were illegally interfering with cars on the public road, and he could be persuaded to depart only after being confronted with the Clerk of Works with his rolls of impressive but incomprehensible plans. (The constable, however, is a persistent fellow and reported to his superiors. As a result, discussion as to whether that corner of England is or is not Air Ministry property is likely, I believe, to provide secure employment for a number of Ministry and local authority officials for some years to come.)

Several officers now began to express grave concern about their lunch, for their wives had gone to shop in the village and their chances of breaking back through the cordon seemed poor, though actually they all talked themselves in without difficulty. At 11.40 a khaki-uniformed tough walked into the office, drew a chalk cross on my desk and asserted that I had been demolished. At about the same time, the S.W.O. was overheard to say that we never 'ad no flippin' bull like this in the war.

I rang for the Adjutant. By noon the station had returned to normal.

J. N. T.

Author's note: If anyone, with the exception of my family, thinks that he can recognize either himself or any particular station, he will be quite wrong.

[Air Ministry Photo

EHRWALD, AUSTRIA, 7th FEBRUARY, 1954

Left to right: Group Captain J. Worrall, D.F.C.; Pilot Officer N. Galpin; Flight Lieutenant Z. Kaye; Flight Lieutenant P. Smith; Group Captain W. Crawford-Compton, D.S.O., D.F.C.; Air Marshal Sir Harry Broadhurst, K.B.E., C.B., D.S.O., D.F.C., A.F.C.; Herr Fritz Sonnweber, Proprietor of Ehrwald Ski Skule; Herr Eddie Sonnweber, Ski Instructor to R.A.F. Team; Wing Commander B. Drake, D.S.O., D.F.C.; Flight Lieutenant P. Davis; Flight Lieutenant J. A. Horrell.

SPORT IN THE R.A.F.

"WINTER SPORTS"

By Group Captain J. Worrall, D.F.C.

IN the Inter-Service Ski Championships held at St. Moritz in February, 1954, the Army came first, the Royal Air Force second and the Royal Navy third. First home was Lieutenant R. Hooper of the Army; of the Royal Air Force team Group Captain W. Crawford-Compton came fifth, Flight Lieutenant Z. Kaye seventh, Pilot Officer N. Galpin eighth and Flight Lieutenant A. Davis eleventh.

The Royal Air Force Ski Championships were held at Ehrwald with the following results:

		Slalom	Downhill
1st	Flight Lieutenant Z. Kaye	91.2	2.42.6
2nd	Group Captain W. Crawford-Compton ...	91.2	2.56.8
3rd	Pilot Officer N. Galpin	97.0	2.49.8
4th	Flight Lieutenant A. Davis	100.6	2.53.0

Pilot Officer N. Galpin is the Second Tactical Air Force champion. The R.A.F. won the Cresta Inter-Service Championship; Flight Lieutenant C. N. C. Mitchell put up the fastest time of the race, day and season—45.8 seconds ; he also won the Curzon Cup in the world record time of 45.1 seconds, which beat the best previous record by one second. This is the first time the Curzon Cup has been won by the United Kingdom in seven years.

HOLIDAY SCHEME

The aim of the Royal Air Force Ski and Winter Sports Association's holiday scheme is to arrange a winter sports holiday at the lowest possible cost taking advantage of party rates for travel, accommodation and ski-ing.

The facilities included in the all-in costings are return air or rail travel, full board, gratuities, local Austrian tax, four hours ski instruction every weekday and unlimited use of the ski lift. The scheme is open to all members and ex-members of the three Services, their families and friends.

Third Class rail (for Second Class add about £5), from £30.
By Charter aircraft to and from Munich—coach to and from Ehrwald, from £32.
Joining locally, from £14.

According to season and the class of accommodation selected. There are reduced rates for children under ten.

Owing to its success last year Ehrwald in Austrian Tyrol has been chosen again for the 1954/55 season.

Six parties are being organized—each will leave on a Monday and return to London on the Tuesday fortnight following, giving thirteen nights in Ehrwald. Party No. 1 leaves 20th December and returns on 4th January. Members travelling by air will have one extra night in Ehrwald, leaving and returning on Mondays.

Full particulars may be obtained from the Honorary Secretary, York House, Kingsway, W.C.2, Temple Bar 1215, Exts. 3872 or 3887, or from the Association's Agents, Powell Duffryn (Air), Ltd., St. Mary Axe, E.C.3, Telephone Avenue 1803.

CRICKET IN THE ROYAL AIR FORCE

By Squadron Leader L. H. Clint, R.A.F.
Hon. Secretary, Royal Air Force Cricket Association.

Sport & General Ltd.

THE ROYAL AIR FORCE XI v. THE ARMY AT LORD'S

14*th and* 16*th August*, 1954

Back Row—A.C. Parker D. (R.A.F. Full Sutton); A.C. Jennings J. A. (R.A.F. Danby Beacon); A.C. Cowan M. J. (R.A.F. St. Athan); A.C. Tindall R. A. (R.A.F. Stanmore); A.C. Allan D. A. (R.A.F. Middle Wallop); A.C. Murray J. T. (R.A.F. Innsworth).
Front Row—A.C. Horton M. J. (R.A.F. Barnwood); F./Lt. M. D. Fenner (R.A.F. Binbrook); S./Ldr. A. C. Shirreff (H.Q., F.T.C.); F./Lt. R. Leggett (R.A.F. Marham); P./Offr. T. A. Hall (R.A.F. Henlow).

NOW that the 1954 Cricket Season is over, it is possible to sum it up in three small, but nevertheless disastrous, words—"Rain stopped play." The full effects on the financial side are not yet known, but already the indications are clear enough and many Committees must be wondering anxiously how they are going to tide their Clubs through to next season.

The Royal Air Force XI suffered with the rest, and of their eleven matches only one—and that the most vital one of all—escaped some unwelcome attention from the weather.

The match in question was, of course, the game against the Army which was played at Lord's on Saturday and Monday, the 14th and 16th August, and looking back some of the Royal Air Force XI may well have wished that the weather had taken a prominent part. Certainly the team chose this occasion to produce their one inept performance of the season and they were soundly beaten by an Army side which was better equipped in all departments, and which went about the task of winning the game in a more resolute and workmanlike manner.

When the game started, it did seem the tide was running in favour of the Royal Air Force. Squadron Leader Shirreff won the toss and, as the ground was thoroughly saturated from heavy rains earlier in the week, he assumed that the wicket, after a quiet beginning, would soon behave badly in the hot and genial sunshine.

He therefore put the Army in and when Lance-Corporal Peter Richardson and Gunner Cartwright were both back in the Pavilion for thirteen runs our hopes soared. The pitch, however, remained quiescent and although the odd ball came through low, it never really responded to spin. The Army, after this early setback, batted doggedly and thanks mainly to Lance-Corporal Barker, who collected 67 not out, they eventually amassed the not very impressive score of 144.

Certainly we had every reason to feel optimistic when our opening pair, Aircraftman Murray and Aircraftman Parker, went out to start our innings, and for a while we were content. The Army skipper, Captain J. H. G. Deighton, and Private T. Spencer (Leicestershire) opened the attack and, while Parker defended, Murray scored attractively all round the wicket. With 23 runs on the board Captain Deighton switched to his spinners, Lance-Bombardier Sainsbury and Corporal J. Dyson, and from that moment the tide turned against us. None of the Royal Air Force players had the courage—or possibly the ability—to attack. As a result wicket after wicket was given up, only Squadron Leader Shirreff and Flight Lieutenant Leggett putting up any prolonged resistance.

Nine wickets were down for a mere 90 runs, but Aircraftman D. A. Allan and Aircraftman Cowan managed to notch a further 13 before the former got his leg in front to Sainsbury and the innings closed for 103.

On Monday the weather was again perfect when the Army resumed against the bowling of Cowan and Hall. Both bowled really well without having a great deal of luck and although wickets fell regularly, runs came fairly steadily so that, with the score at 176 for 6 wickets, Captain Deighton was able to declare, setting the Royal Air Force to get 217 to win in 3 hours 5 minutes. Even this should not have been an impossible task, for the wicket was still playing easily, but it was soon apparent that the same curious ineptitude which characterized the first innings was to be repeated in the second. Only Aircraftman Horton showed himself capable of any defence against the keen bowling and fielding of an Army XI with tails well up, and when he went at last with a personal score of 19, one knew it would be only a matter of minutes before the last two batsmen would succumb: and so it proved. The Royal Air Force innings ended for 63 at five minutes past five, leaving the Army worthy victors by 154 runs.

In the earlier games in the Inter-Service Championship the Army batted first against the Royal Navy and had scored 227 runs for the loss of four wickets when rain caused the match to be abandoned.

In the match between the Royal Air Force and the Royal Navy, which this year was played at Halton, only one day's play was possible. The Royal Navy, batting first, scored 163 (Lieutenant Commander A. L. Thackara 100) and the Royal Air Force replied with 175 for 9 wickets.

Of the remaining matches played by the Royal Air Force during the Season, five were won, three drawn and one abandoned, and although the 1954 XI could never be described as a great team, their previous performances were sufficiently good to make it all the more disappointing and hard to understand that they should so unaccountably collapse in their final game.

SMALL ARMS ASSOCIATION

BY GROUP CAPTAIN E. H. HOOPER, C.B.E. (Retd.)
(*Deputy-Chairman R.A.F.S.A.A.*)

[*Photo: Gale & Polden Ltd. Aldershot*

The Chairing of the Champion.

TORRENTIAL rain heralded the opening of the 28th R.A.F.S.A.A. Championship Meeting at Bisley in June, so that at the end of the preliminary events the famous Century Range acquired a lakeland appearance. These conditions, however, neither damped the enthusiasm of the 1,500 competitors nor detracted from the customary high standard of shooting.

The meeting was noteworthy for the unusually large number of National Service men attending this Mecca of shooting for the first time. In the outcome they contributed worthily to the high prestige which the Royal Air Force continues to enjoy in the shooting world. Entries from no less than 132 stations for the important Trenchard Station Team Competition, and some 1,200 contestants for the individual rifle championships, indicate the extensive support which is given to shooting throughout the Service, and this in spite of heavy commitments in other directions. This could not have been achieved without the constant encouragement of commanders in all spheres.

The finals, held on 18th June, were witnessed by a large gathering of senior guests who were received by the President of the R.A.F.S.A.A., Air Chief Marshal Sir Ronald Ivelaw-Chapman, K.C.B., K.B.E., D.F.C., A.F.C., and included George Ward, Esq., M.P., Parliamentary Under-Secretary of State for Air, and other members of the Air Council, Air Officers Commanding-in-Chief, Assistant Chiefs of the Air Staff and Group Commanders, as well as Marshal of the Royal Air Force The Lord Tedder, G.C.B., who is a Vice-Patron of the Association and Chairman of the National Rifle Association, and Marshal of the Royal Air Force Sir John Slessor, G.C.B., D.S.O., M.C., who is also a Vice-Patron of the R.A.F.S.A.A.

Trophies and prizes were presented by the Parliamentary Under-Secretary of State for Air.

Earlier in the day the winner of the Service Rifle Championship, Sergeant C. H. Greenlee, of R.A.F. Ballykelly, had been "chaired" and played off the range by the R.A.F. Central Band. By virtue of winning this championship, Sergeant Greenlee has become this year's R.A.F. winner of the Queen's Medal for Champion Shots of the Air Forces which was instituted by Her Majesty in 1953.

Sergeant Greenlee is a comparative newcomer to full-bore shooting, but for some years has been an ardent small-bore shot. Here is an example of the valuable grounding to be obtained in the small-bore nursery of shooting.

The Royal Air Force has again acquitted itself well in the National Rifle Association Meeting, held at Bisley in July, in which competitors from many parts of the Commonwealth take part. R.A.F. contestants figured prominently in the prize lists and were particularly successful in all the revolver shooting competitions. The Inter-Services matches, which are fired at this meeting, resulted as follows:

United Service Challenge Cup (*S.R.a*). Teams of eight.—Won by the Royal Navy, score 1,339. 3rd, R.A.F., score 1,324.

Inter-Services XX Match (*S.R.b*). Teams of twenty.—Won by the Royal Marines, score 2,711. 3rd, R.A.F., score 2,703.

Whitehead Challenge Cup (*Revolver*). Teams of eight.—Won by the Royal Air Force on the tenth successive occasion, with a score of 717. 2nd, the Regular Army, score 642.

Burdman Challenge Cup. Aggregate of the three inter-services team events.—Won by the Royal Air Force, score 4,744. 2nd, the Regular Army, score 4,684.

Flight Lieutenant H. H. Jones, of R.A.F. Pembroke Dock, has had the distinction of being selected as a member of the team representing Great Britain in a series of rifle meetings held in Canada recently.

ROYAL AIR FORCE ATHLETIC CHAMPIONSHIPS, 1954

By Squadron Leader R. B. Lord

AT a three-day meeting held in the Stadium, Royal Air Force, Uxbridge, athletes representing all Commands competed in brilliant weather for the 1954 Athletic Championships.

On the final day in the R.A.F. events, Fighter Command with 134 points gained an impressive victory in the Inter-Command Competition over Technical Training Command (68 points), with Bomber Command (41 points) third.

Athletes of Fighter Command in gaining this victory and ending the domination of Technical Training Command, who have held this trophy since the war, won eleven trophies out of eighteen, and provided six of the ten record-breaking athletes.

The meeting was significant in the general improvement of the standard of athletics in the Royal Air Force, and in the number of new records created. These were:

880 YARDS.—Flying Officer Goater (Fighter Command), 1 min. 54.8 secs. New record. (First three broke R.A.F. record.)

ONE MILE.—A. C. Barrett (Maintenance Command), 4 mins. 13.4 secs. New record. (L.A.C. Dunkley—2nd equalled R.A.F. record.)

THREE MILES.—Corporal Ranger (Fighter Command), 14 mins. 1.5 secs. (First three broke R.A.F. record.)

HOP, STEP AND JUMP.—Corporal Eggleton (Bomber Command), 47 ft. 6½ in. New record.

POLE VAULT.—Flying Officer Elliott (Fighter Command), 12 ft. 4½ in.

THROWING THE DISCUS.—Flying Officer Elliott (Fighter Command), 140 ft. 2 in. (First two broke R.A.F. record.)

THROWING THE HAMMER.—Sergeant Harper (Home Command), 161 ft. 0 in.

PUTTING THE SHOT.—Flight Lieutenant Neville (Fighter Command), 44 ft. 8 in.

220 YARDS (W.R.A.F.).—Flight Sergeant Dowdswell (Technical Training Command), 27.1 secs. New record. (First and second broke R.A.F. record.)

INTER-COMMAND RELAY.—Fighter Command, first, 53.5 secs. New record. (First two broke W.R.A.F. record.)

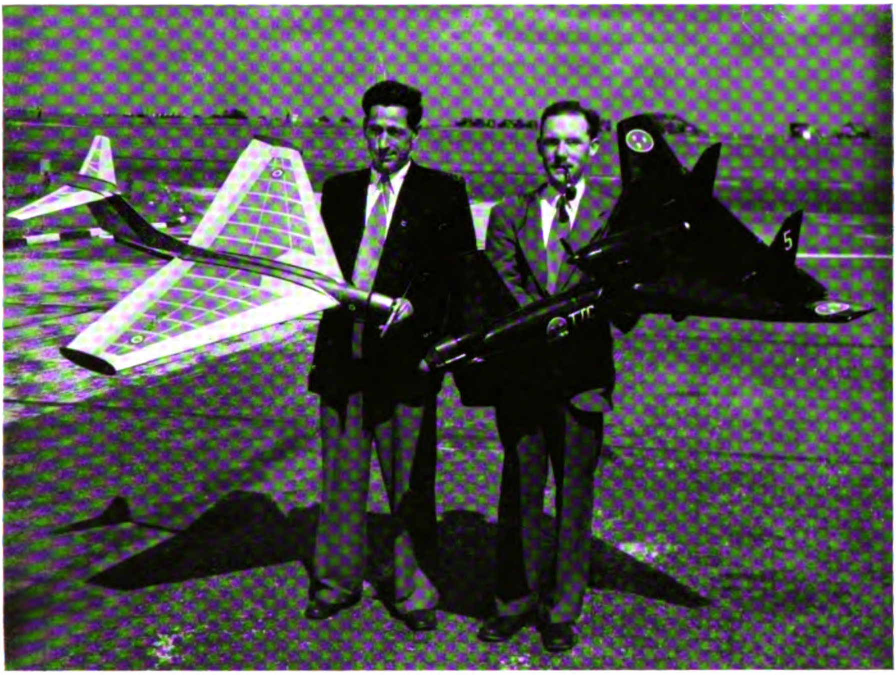
Flying Officer G. M. Elliott of R.A.F. Stanmore and Flying Officer J. McGhee of R.A.F. Turnhouse represented England and Scotland at the British Empire Games at Vancouver. Elliott, the English and British National Pole Vault champion, and McGhee, Scotland's Marathon champion, both won their events at Vancouver.

There is no doubt that next year's championships will see even more intensive and keen competition than in 1954.

RECORD-BREAKING POLE VAULT

Flying Officer G. N. Elliott of R.A.F. Stanmore Park, breaking the Pole Vault record by no less than 3 ft. 9 in. in magnificent style with a vault of 13 ft. at the Group Athletic Championships on 2nd June, 1953. Flying Officer Elliott is also the holder of the British National and Empire record at 14 ft.

MODEL AIRCRAFT CHAMPIONSHIPS



R.A.F. MODEL AIRCRAFT UNITED KINGDOM CHAMPIONSHIPS

Squadron Leader Ellis of R.A.F. Debden (left) with his free flight experimental delta wing model, weight 26½ oz., powered by a K & B 1.5 c.c. torpedo diesel engine, and Sergeant McHard of R.A.F. Wellesbourne, with his experimental delta wing Canard model, weight 3 lb., powered by a Frog 1.5 c.c. Sergeant McHard won the Victor Ludorum Trophy at the Championships.

THE annual championship two-day meeting of the Royal Air Force Model Aircraft Association took place at Royal Air Force, Horsham St. Faith, on 14th-15th August, when twenty-one events were competed for by over two hundred modellers from all commands of the Royal Air Force.

The weather was perfect on the first day and full advantage was taken of this by contestants who flew models continuously from 0620 hours, when test flying started, until dusk—long after the official preliminary events had been decided.

The Concours d'Elegance showed that the standard of presentation, construction and detailed finish of models was exceptionally high and compared favourably with that seen anywhere in this exacting class of an aeromodellers' handicraft.

Squadron Leader Ellis of Royal Air Force, Debden, and Sergeant McHard of Royal Air Force, Wellesbourne, entered two most interesting experimental models—the former a delta wing with a flying tail, the latter a large Canard weighing 3 lb. Both these models flew consistently well during the Championships.

About 3,000 spectators were treated to some exceptional flying in the Scale model contest, first by Flying Officer Norman's Tiger Moth complete with travelling Form 700 in the locker, and towing a banner advertising the N.A.A.F.I.; and by the Supermarine Seagull of Junior Technician Percival.

The Radio Control event was won easily by S.A.C. Lock with a five-year-old model and a home-constructed transmitter and receiver. His spot landing from a glide was only 5 yards short. Squadron Leader Ware gave a convincing demonstration with his twin-rudder model, ending with a landing on the runway in front of the spectators.

The contest was directed by the Association's Competition Secretary, Flight Lieutenant Coutts-Smith, and among the spectators were the Commander-in-Chief, Fighter Command, Air Marshal Sir Dermot Boyle, K.C.V.O., K.B.E., C.B., A.F.C., the Association's President; the Commander-in-Chief, Bomber Command, Air Marshal Sir George Mills, and Lady Mills; the former President of the Association, Air Chief Marshal Sir Hugh Pugh Lloyd, K.C.B., K.B.E., M.C., D.F.C., LL.D.; the A.O.C. 12 Group, Air Vice-Marshal Crisham, C.B., C.B.E.; Group Captain Aitken and Mrs. Aitken; Group Captain Saw and Mrs. Saw; Dr. Thurston, President of the Northern Heights M.A.C.; and Mr. Houlberg, President of the S.M.A.E.

Sir Dermot Boyle at the prize-giving spoke of the value of quality as opposed to quantity, and it was the former which had impressed him during the championships. He concluded by saying how valuable aeromodelling was, as it brought those in the Service into closer contact with our civilian friends.

Dr. Thurston, after presenting the Thurston Trophy, said not only was he happy at the great progress made by the Association since its formation in 1949, but by the comradeship and enthusiasm shown by all the contestants, of all ranks, both Service and civilian.

Results

CONCOURS D'ELEGANCE

Solid Scale: Sergeant McHard, Technical Training Command.
Flying Scale: Flight Lieutenant Coutts-Smith, Fighter Command.
Control Line: Flight Lieutenant Gaunlett, Fighter Command.
Gliders: Flight Lieutenant Gaunlett, Fighter Command.

MISCELLANEOUS

Free-Flight: Sergeant McHard, Technical Training Command.
Open Rubber Contest: Flying Officer Cannell, Fighter Command.
Open Glider Contest: Corporal Stewart, Flying Training Command.
"A.2" Glider Contest: Leading Aircraftman Martin, Maintenance Command.
Radio Control Event: S.A.C. Lock.
Unorthodox Event: Sergeant McHard, Technical Training Command.
Control-line Speed Handicap: Leading Aircraftman Watson, Fighter Command.
Control-line Open Aerobatic Contest: Corporal Lloyd, Fighter Command.
Control-line Team Racing (Class "A"): Leading Aircraftman Chapman, Maintenance Command.
Control-line Team Racing (Class "B"): Corporal Anderson, Fighter Command.
"A" Team Racing Event: Leading Aircraftman Gordon, Fighter Command.
Apprentices and Boy Entrants Event: A/A Hayter, Technical Training Command.

TROPHIES

The "Aeromodeller" Trophy: Leading Aircraftman Martin, Maintenance Command.
The "Model Aircraft" Trophy: Sergeant Usher, Maintenance Command.
The "Wilmot Mansour" Challenge Trophy: S.A.C. Pratt, Coastal Command.
The "Thurston" Trophy: N. A. Norman, Esq., Ipswich M.A.C.
The "R.A.F. St. Athan" Trophy : Flying Officer Norman, Transport Command.
The "Victor Ludorum" Trophy: Sergeant McHard, Technical Training Command.

R. B. L.

ROYAL CANADIAN AIR FORCE

No. 14 TRAINING GROUP

As a result of greatly increased training commitments assumed by the R.C.A.F., both for Canada and other N.A.T.O. countries, it became necessary to form numerous aircrew training stations and schools during 1951 and 1952.

The new stations and schools are located in Western Canada in accordance with the R.C.A.F. policy to centre aircrew training in this area. As a result of this rapid expansion it was decided to decentralize some degree of administration and functional control over these establishments from Training Command Headquarters, Trenton, Ontario, by forming a Training Group Headquarters in Western Canada with headquarters at Winnipeg, Manitoba.

Old wartime buildings were renovated and new ones erected. Station services were rehabilitated, roads repaired and runways and tarmacs made serviceable. Considerable work is being done towards extending old runways to meet the needs of jet aircraft and new runways commenced. Such wartime stations as Gimli, Macdonald and Claresholm have taken on new life and emerged as vital cogs in the R.C.A.F.'s training machine.

Much more remains to be done at all 14 Training Group units with a view to improving working, training, flying and living conditions, but a sense of urgency to get the job done which prevails at all units ensures the success of the programme.

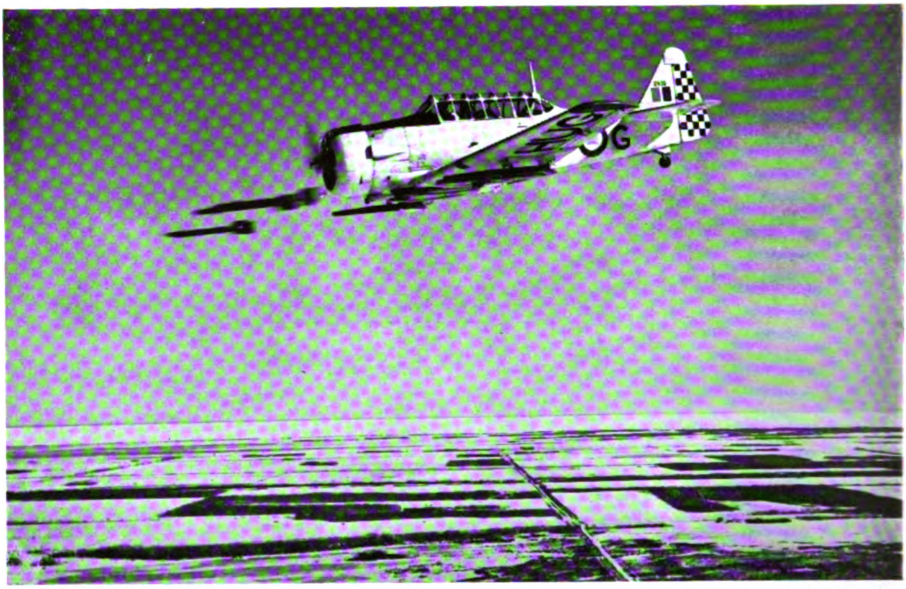
The primary function of 14 Training Group is to train aircrew. To this end, basic and advanced courses are conducted which are designed to produce well-qualified pilots and navigators, to meet the needs of the R.C.A.F. and other services of N.A.T.O. members.

At present, four distinct types of courses are given. These are:

Basic Training for Navigators
Basic Training for Pilots
Advanced Training for Pilots
Weapon Training for Pilots.

Basic training for *Navigators* is carried out at the Air Navigation School, Winnipeg. Here the students receive highly concentrated instruction consisting of three distinct phases—ground school, air training, and officer development training. The course is designed to train the student in the fundamentals of various navigational techniques and to navigate Service aircraft with confidence and skill under any conditions, using all navigation aids employed in the Service.

Each student carries out over 150 hours of actual flying training, including day and night exercises. These exercises give practice in map reading, and include cross-country exercises using various plot methods and types of maps. They are carefully prepared to provide as much air practice as possible



[National Defence Photo

"MODERN AIR GUNNERY PRACTICE"

Firing four rockets at a ground target from a Harvard trainer.

[National Defence Photo

Talking over the day's flying experiences by the wing of one of their Harvard training aircraft are a group of N.A.T.O. trainees, all hailing from England. Left to right: Pilot Officer W. L. Farquharson, Pilot Officer W. Mason, Pilot Officer J. B. England. Pilot Officer G. Sedgwick, Pilot Officer A. H. Erquhart, Pilot Officer T. M. Vessey.

on all phases of air navigation, including astro navigation, low level navigation, pressure pattern flying, etc. Emphasis is laid on the air work of students to ensure they attain a high standard of proficiency and reliability.

Trainees are given a thorough and exhaustive navigation course, and those who qualify for their wings are in truth highly qualified navigators.

Coincident with their specialized training as navigators, students are taught the basic fundamentals of Service organization procedures, writing, publications, Air Force Law and general administration. This knowledge, coupled with the training they received in leadership, Service procedure and customs, citizenship, public relations, etc., as officers, serves to make the graduates of the Air Navigation School exceptionally well suited for their future roles as members of aircraft crews and eventually assume even more responsible positions in the Service.

National Defence Photo

Navigation students—sextant practice.

Flying Training Schools at Moose Jaw, Saskatchewan, and Claresholm and Penhold, Alberta, provide basic flying training for *pilots* on the ever-reliable Harvard aircraft. A major portion of the course is allotted to briefings and analysis, a most important part of the training programme.

Ground instruction, including pre-flight and post-flight briefing, is aimed at enabling students to obtain maximum benefit from their in-flight training. Close liaison is maintained between ground and air instruction and maximum use is made of training aids.

Flying instruction is designed to produce a pilot competent to fly single-engined aircraft under various conditions likely to be encountered by a military pilot. He must be capable of carrying out flights (by day and night) using basic flight instruments; cross-country flights using pilot navigation methods; aerobatics; formation flying; emergency landings; controlled descents; radio range and radio compass procedures, and V.H.F. homings in poor visibility.

An integral part of all aircrew training in the R.C.A.F. is the development of qualities of leadership, initiative, reliability and character essential to a potential officer. A pupil who cannot meet the requirements set for this phase of his training is considered unsuitable for further training.

Each student's individual interests and capabilities are studied and a decision made as to whether he will proceed to Single Engine Advanced Flying School or a Multi-Engine Advanced Flying School.

Graduates of a Flying Training School selected for advanced flying training on fighter type aircraft are posted to the Advanced Flying School, Portage la Prairie, Manitoba, where their basic training is adapted to flying advanced operational exercises. At present this instruction is given on Harvard aircraft, but these are being replaced by the T-33 Silver Star jet trainer, being built in Canada by Canadair of Montreal.

In addition to carrying out basic exercises on the advanced trainer, pilots are required to meet higher standards of accuracy and reliability in carrying out operation exercises such as simulated fighter squadron rapid landing procedure, formation flying, high altitude, high speed cross-country flights, air interception, V.H.F. homings and fighter tactics.

A conscious effort is made to give pupils experience in the administration problems likely to be encountered in a flight or squadron and thus make them more adaptable and valuable officers.

Due to begin operations soon at Gimli is a second Single Engine Advanced Flying School.

In keeping with the R.C.A.F.'s predominantly fighter defence role, all R.C.A.F. graduates of the Single Engine Advanced Flying Schools receive special training as fighter pilots. This training commences at the Pilot Weapons School, Macdonald, Manitoba, where Single Engine Advanced Flying School graduates are taught the intricacies of fighter combat flying. At present this training is given in Harvard aircraft, but these are being replaced with T-33 jets, as at the Single Engine Advanced Flying School.

While emphasis is placed on air-to-air firing, the methods of making effective ground strafing, live bombing and rocket attacks are also taught. Pupils are also instructed on the use of small arms such as rifle, revolver and shotgun. Time is also spent on aircraft recognition practice.

By correlating instructors' observations, actual live firing scores and cine gun films, an accurate account is obtained of each pupil's ability to score hits. This process is a continuous and progressive one and coupled with briefings and analysis of each exercise serves to guarantee that each pupil is thoroughly trained in basic fighter combat techniques prior to proceeding to a squadron.

Graduates of the Pilot Weapons School continue their operational training at an Operational Training Unit in Air Defence Command and/or at fighter squadrons. This training gives further practice in air firing and more detailed instruction on squadron tactics and procedures.

Graduates of the Flying Training School destined for operations other than fighter proceed to the Multi-Engine Advanced Flying School, at Saskatoon, where they receive instruction on twin-engine Mitchells. These are the student aircrew destined for transport, maritime, and other types of operations. From the A.F.S. they go to the appropriate Operational Training Unit, operated by Air Transport Command or Maritime Air Command, and then on to a squadron.

The Prairies served as the home of the British Commonwealth Air Training Plan, which produced more than 131,000 trained aircrew to carry war in the air into enemy territory during the Second World War. It has been cited as one of the major items in the Allied victory.

Once again the Prairies are serving as the home of a flying training scheme which, while not as large as the famed B.C.A.T.P., is nevertheless playing an important part in deterring aggression and in making Canada strong.

ROYAL AUSTRALIAN AIR FORCE

THE QUEEN AT POINT COOK

By Wing Commander T. S. Ingledew, R.A.A.F.

ONE thousand nine hundred and twelve is a long time ago. If you look upon old newspapers with pictures of cars, clothes and city streets of those days, you will appreciate the changes that have been made in the last 42 years. Flying was in its infancy, yet military flying in Australia started in that year in a paddock by the side of Port Phillip Bay in Southern Victoria.

This paddock became the flying training school for the Australian Flying Corps during 1914-18, and when the Royal Australian Air Force was first created as a Service separate from the Army and Navy in the early 1920's, the first R.A.A.F. Station was formed in the same location.

Point Cook can proudly boast of being the centre of flying training in Australia since the first military flying began, and it was probably for this reason that Point Cook was chosen as the one place where Her Majesty would pay an official visit to the Royal Australian Air Force during her Australian tour.

Early in 1953 we were informed of the Royal Visit and in May we prepared detailed proposals. These were sent to Headquarters and approved in principle. Inevitable changes in both policy and detail took place as more information became available, and the ultimate result became Air Force history on 6th March, 1954.

To anyone not engaged in organizing a visit of this nature, the need for such detailed planning may seem strange. Just think for a moment, however, of the problems involved.

Because of Her Majesty's busy tour we were given exactly 56 minutes in which to complete the programme. This included a ceremonial parade of the Queen's Colour and a visit by Her Majesty and His Royal Highness to a static display of aircraft where the Royal couple could see, at close range, practically every training and operational aircraft in service in the Royal Australian Air Force, including the Canberras which flew in the Air Race last year and Australian-built Sabre jet fighters with which our fighter squadrons will be re-armed. This was to be followed by an informal "Garden Party" where the Royal couple could move through the tea enclosures for airmen, officers and official guests, and meet representatives from each section.

We had to get all the aircraft there with their ground staff and aircrews; we had to plan and rehearse the parade, control traffic and parking, and we had to move about 8,000 people from three enclosures to three other enclosures over a quarter of a mile away in twelve minutes without letting them get mixed up. We had to move 800 personnel from the ground when Her Majesty left the parade and within 25 minutes have them placed in a new formation lining the half-mile of road along which Her Majesty's car would pass when she left the tea enclosure for her return to the Royal train. What's more, we had to do all this under the eyes of an audience which was professionally qualified to criticize.

There was the Prime Minister and several senior Cabinet Ministers (among them the Minister for Air, who was host for the day), the State Premier, the Chiefs of Staff of the Army and Navy, and Chief of Air Staff, members of the Air Board and many of the senior officers, now retired, who built the Air Force into what it is today. In addition, there were the Air Officers commanding all Commands and Areas, and over sixty members of the press representing papers from all over the world. Most important of all, there was Her Majesty, and the Duke—himself a Service man. We hoped their visit to the Royal Australian Air Force would not suffer by comparison with their visits to other famous Service establishments throughout the world, and we hoped our parade would not suffer by comparison with the parades of the Guards and the other famous regiments which Her Majesty had seen since her childhood.

To do all we wished, we had to plan and work. We had to envisage our flower display eight or nine months before the visit and order 25,000 of the type of seedlings we wanted so that the nurseries could grow them for us to plant in September and October of 1953. We walked around, worked out the extension of gardens, bought and planted shrubs, built lily ponds, laid down new lawns and prayed for rain at the right time and sunlight when we needed it. Buildings were painted. Our rather bare front entrance was improved with new gardens, lawns and some prunus shrubs which we nourished and cared for like children. Unhappily, a local farmer had a weak fence and five sheep supplemented their diet with prunus and freshly grown lawn for about a week. Every day they were driven up the road, and every night they came back again. The Warrant Officer in charge of the gardening arrangements was reduced to a stage of speechless fury that the rawest of the new recruits had never been able to produce.

In the end, we bought some more prunus trees, and erected our own fence around the plot, but on the day, the local Mayor and Councillors gathered there. It is very doubtful whether Her Majesty ever knew there were shrubs there at all, much less what sort they were!

Apart from the gardens, and our constant prayers either for rain or for it to stop raining, we worked out things on paper and walked and drove around with stop watches to try them out. We talked to representatives of the press and newsreel companies, the Australian Broadcasting Commission, the State Tour authorities, the police, and an almost incredible number of others. We worked out a detail of the parade and started training personnel. We wrote our orders, and somehow kept the normal work of the unit going.

We tried to think of every conceivable thing that could go wrong—from fires in the canteen to forced landings, from gate-crashers in large numbers to traffic jams on the Geelong road, and from a discarded cigarette which might set fire to the grass and burn up all the cars in the parking areas, to rain—which might bog them all. Our first draft of the local orders ran to 56 pages and we had, finally, about 15 additional foolscap pages of notes for the verbal briefing which had to be given to everyone with any responsibility on the day.

Even after all this, at 6 p.m. on 5th March, someone remembered one thing that had been forgotten. Parades attract children and dogs, and although the children would be kept under control, we had forgotten the dogs. The next morning 12 trainees swept the units, and about eight unhappy dogs of assorted sizes and breeds were locked up in an empty hut on the other side of the Aerodrome until the parade was over.

Next day the Royal train arrived at Laverton's railway station, four miles from Point Cook, at five minutes past three. As Her Majesty stepped from the train into her car, a watching N.C.O. spoke softly into a telephone, a stopwatch clicked in the Control Room at Point Cook and the result of ten months' work and planning was being put to the test, for better or worse.

Twelve Vampires were already airborne on a wide circuit of about 100 miles, timed to bring them over the parade ground in salute 49 seconds after Her Majesty stepped on the dais at the saluting base. Successful planning (so far at least!) had already put over 8,000 guests and members of the Service in the correct enclosure to view the parade, and their cars or buses in the right parking areas. First Aid Posts were set up. 800 officers, airmen and W.R.A.A.F. were drawn up on parade, newsreel and press cameramen were in place on the roof of the Headquarters Building, and in the special press enclosure two broadcasting microphones were ready with the announcers standing by. The weather was beautiful, and our gamble on flowers, taken when they were planted months before, had succeeded. They were all flowering, including one pond full of water lilies which had just been placed there the day before!

At 1520 hours the officer at the microphone of the public address system said quietly, " Ladies and gentlemen, Her Majesty has just entered the gates of Point Cook."

It was an attractive scene from the Control Room. The yellow, rolled gravel of the parade ground contrasted with the deep green of the cypress trees which entirely surrounded it. The polished bayonets and white webbing of the airmen, and the gilt sword hilts and buttons of the officers, stood out against the dark blue uniforms. There was hardly a sound, barely a move, either from the massed spectators or the troops, still standing easy, on parade. The sun glinted on medals and decorations and brightened the colours of the massed dahlias, zinnias and phlox. The cool westerly breeze was just strong enough to stir the flowers and the flags on the three slender white poles set around the grey stone memorial to the Australian Flying Corps on the far side of the parade ground. On the tall white mast at the rear of the saluting base the Australian ensign flew, and there was a tightly rolled bundle at the masthead—the Royal Standard, waiting to be broken when Her Majesty arrived.

At 1523 hours Her Majesty Queen Elizabeth the Second alighted from her car in front of the Headquarters Building. At 1524¾ she mounted the dais. The Parade Commander ordered " ROYAL SALUTE—PRESENT ARMS " and the Royal Standard broke clear and stood out in the strengthening breeze. A roll of drums and the band softly played " God Save the Queen." As Her Majesty stepped from the dais on the green lawn to move forward and inspect the parade, twelve silver Vampires swept over in salute.

The escort squadron (including some National Service trainees with six weeks' service) marched like Guards (nearly); nobody dropped a rifle, nobody stepped off on the wrong foot, nobody fainted; and the 8,000 people, in due course, got to the enclosures within the twelve minutes and without trouble. Her Majesty saw the parade, saw the aircraft and spoke to some of the aircrew

[R.A.A.F. Official Photo

The crews of the Australian Canberras who took part in the London-Christchurch Air Race are presented to the Queen and the Duke. Their leader, Wing Commander D. R. Cuming, O.B.E., A.F.C., A.D.C., introduces the crews.

standing by. She had some refreshments, received a bouquet, met people, smiled and charmed everyone. The Royal party left twenty minutes late, which we hoped meant that Her Majesty and the Royal party enjoyed their visit to the Royal Australian Air Force.

The Very Important Guests departed after Her Majesty, and the tension began to drop. A number of errors had occurred. Some of them were somewhat Rabelaisian ones connected with temporary conveniences, and some were connected with traffic control, where one man, in error, held up several cars he should have allowed to pass. Apart from the people temporarily inconvenienced by the conveniences and the drivers of the cars, no one knew anything was wrong, however, so Point Cook's reputation was untarnished. Four children had been lost—but we had planned for that! A number of items of property from rugs to gold rosary beads were lost, but we had planned for that too. We still haven't found the beads, however, and though we have the rug we now can't find the owner.

By 6 p.m. it was time to relax, and time for a cigarette. I also had two whiskies mixed for me by a Group Captain from Command Headquarters who had been intimately concerned in the planning with us. The whiskies were dark brown and had an obvious air of authority, but it was a time and an occasion to celebrate. A bottle of champagne was opened. Many people were looking relieved, including one officer never known to drink before who had three glasses of champagne and enjoyed them!

The mental stop watches were still running, although the sweep second-hand in the Control Room had long since been stopped. Patrols and Guards were being called in, tea marquees were being dismantled, the last cars were leaving the parking areas for the trip back to Melbourne, and the last aircraft had taken off for its home unit.

There were two signatures, ELIZABETH and PHILIP, on a new page in the Visitors' Book, and the day was over. It was time to start worrying about the accumulation of files in the "Pending" tray that would become next day's problems.

ROYAL NEW ZEALAND AIR FORCE

BRIEF VISIT BY U.S.A.F. GOODWILL MISSION

BY FLIGHT LIEUTENANT G. BENTLEY, R.N.Z.A.F.

WITH the visit last May of the United States Navy contingent still fresh in their minds, New Zealanders recently enjoyed a brief but pleasant contact with the United States Air Force when a goodwill mission known on paper as " Operation Handclasp " brought 100 Americans and five aircraft to the Dominion for a three-day stay.

Major-General Kenneth P. McNaughton, Vice-Commander of the United States Far East Air Force and leader of the mission, told a Press conference that New Zealanders might see more and more of American Service men as it was hoped to send U.S.A.F. aircraft to the Dominion " two or more times a year."

He added that he hoped R.N.Z.A.F. aircraft would be seen " up our way," and a fortnight later New Zealand's Chief of Air Staff (Air Vice-Marshal W. H. Merton, C.B., O.B.E., R.A.F.) announced that Hastings aircraft of No. 41 Squadron were to operate a courier service in support of the New Zealand Army in Korea.

There seems little doubt that the Allied air forces will be co-operating more and more in this new military era in which air power has emerged the dominant factor in the challenge to Communism.

AMERICANS POPULAR

The American airmen created a most agreeable impression wherever they went, in shops and hotels, in the streets, on public transport and with their hosts, the Royal New Zealand Air Force. Whether they were hand-picked or not, each officer encountered in New Zealand was friendly, courteous, and interested in the country he was visiting to a degree that could scarcely be bettered by the professional diplomat.

With Major-General McNaughton was Major-General Chester E. McCarty, Commander of No. 315 Air Division, Tokyo, and Colonel John L. Sullivan, U.S. Air Attaché in Australia and New Zealand.

The day following their arrival at R.N.Z.A.F. Station, Ohakea, General McCarty spoke to Royal New Zealand Air Force officers in Wellington and the small audience found it easy to listen to this brilliant militarist who was already distinguished as a lawyer and senator when he entered the United States Air Force and embarked on a Service career.

The arrival of the five aircraft at Ohakea created unusual interest. Between

[Copyright Photo News Ltd., Wellington, N.Z.

Major-General Kenneth P. McNaughton, Vice-Commander of the United States Far East Air Forces (second from left), and Major-General Chester E. McCarty, Commander No. 315 Air Division, Tokyo (right), are met at R.N.Z.A.F. Station, Ohakea, by Air Commodore G. Carter, C.B.E., Air Member for Supply, representing the New Zealand Air Board.

4 p.m. and 6 p.m. large crowds assembled, and there were almost as many civilians outside the Station bounds as there were Service personnel within. By 6 p.m. all the aircraft, three Boeing Superfortresses, a Douglas Skymaster, and a Douglas Globemaster, were down and parked.

Ohakea gave an excellent welcome to the American airmen. After being formally received by the station commander, Wing Commander W. H. Stratton, the Air Member for Supply, Air Commodore G. Carter (representing the New Zealand Air Board), and the United States Army attaché in Wellington, Colonel Julian G. Hearne, Jun., the visitors were taken to their respective messes to be entertained at dinner.

Only complaint heard from the Americans was the brevity of their stay. Although the R.N.Z.A.F. tried to show them as much as possible of the country, there was only one whole day for sightseeing; and men who had to service the aircraft did not have that. Arriving in New Zealand late on the afternoon of 16th June, they were off again on 18th June, bound for Australia to take part in exercises with the Royal Australian Air Force.

When Colonel Francis J. Pope, Deputy-Commander of No. 374 Troop Carrier Wing (of 36 Globemasters), was asked in Auckland what sort of a time he had had in New Zealand, he replied "Simply terrific!" But he also commented that a longer visit would have been appreciated by them all.

The crews of the United States warships *Tarawa* and *O'Bannon* fared much better. For their Air Force countrymen, who followed them, it was a flying visit in more ways than one.

SPORT IN NEW ZEALAND

By Stephen Loughnan

NATIONAL CHARACTER AND NATIONAL SPORTS

NEW ZEALANDERS have the reputation of being a sport-loving people with respect for physical prowess and a highly developed competitive spirit. So rugby, better known as "football," has become a national sport for which the Dominion is known throughout the Commonwealth. Not a township is without its football club; every year sees enthusiasm rise to fever pitch, in a way soccer followers of Britain will understand, as provinces compete for national trophies; and for half a century the All Blacks, New Zealand's national football team, has at intervals toured other rugby-playing countries of the Commonwealth.

It would hardly be just, however, to dismiss New Zealand's national sports with reference to rugby only, as soccer, although not as popular, has adherents who can trace their association with the game back to pre-Great War days. Since the last war its popularity has increased, and the credit for this lies to some extent with Britons who have brought their love of the game with them to the Dominion. Strong clubs have existed in the main centres for many years, however; and the battles between the provinces for the Chatham Cup add yearly to a strong and growing soccer tradition.

An Englishman searching New Zealand for his accustomed sports would, in fact, find more than enough to make him feel at home, including a sound turf tradition, good cricket, and track and field events often up to Empire Games standards.

SPORT IN THE R.N.Z.A.F.

Operating on its peacetime basis, the Royal New Zealand Air Force provides opportunities for sportsmen greater than those found in civil life. Wherever possible a mid-week afternoon is left free for practice and competition in approved sports, as well as weekends. Administered by the R.N.Z.A.F. Sports Committee at Headquarters, Wellington, through local committees on stations, facilities for approved sports embrace a wide field. Inter-station and inter-Services competition expenses are met from non-public funds.

Naturally an approved sport, rugby is one at which the R.N.Z.A.F. has excelled, last season emerging from inter-Services competitions as the New Zealand Armed Forces rugby champions. Ex-R.A.F. members have helped to improve soccer standards, and the Service also holds the Priddy Cup, awarded yearly for inter-Services soccer. For the first time since the war, the R.N.Z.A.F. also fielded a rugby team, this season against a New Zealand province, Marlborough, winning 18-12. The team was captained by Flight Lieutenant R. Orr, ex-All Black, who toured Australia with the New Zealand team shortly after the war. Selector-coach for the R.N.Z.A.F. was Squadron Leader L. H. Edwards, All Black trialist, who has extensive experience as a provincial representative player.

It is interesting to note that the Marlborough Province forwards' selector-coach is Squadron Leader S. O. Field, Officer Commanding Boy Entrant School, Woodbourne, while four Marlborough representative players have also been recruited from Woodbourne Station this season. This illustrates the encouragement given Service sportsmen to take part in civil sporting life.

[Photo by N.Z. National Publicity Studios

Surroundings like these in the North Island, on the lower slopes of Mount Ruapehu with the active volcano Ngauruhoe in the background, provide all the exhilaration the winter sport enthusiast demands. In summer this heavy snow mantle disappears, and the bare rock shows almost up to Ruapehu's 9,000 foot summit.

MARKSMEN IN THE SERVICE

Ranking with rugby as a popular and approved sport is rifle shooting, with traditions deeply rooted in the old colonial New Zealand. Actively sponsored during his R.N.Z.A.F. career by Air Commodore S. Wallingford, who will be remembered by an older generation as a former R.A.F. champion shot, this sport has brought great credit to the R.N.Z.A.F. Teams are selected annually to compete in inter-Services and National Rifle Championships, and the 1954 team won the Colvin Cup from Army and Navy.

In 1953 the R.N.Z.A.F. also entered a team for Bisley from the very small number of members of the Service then on duty in the U.K. One of the members, Warrant Officer F. B. Haycock, this year became the champion R.N.Z.A.F. shot, and thus the first New Zealand Air Force rifleman to win the recently instituted Queen's medal.

Not to be outdone by the masculine side of the Service, the Women's Royal New Zealand Air Force have also taken up rifle shooting. Training largely in spare time, teams have reached inter-station competitive level, and have contributed individual contestants to the National Rifle Championships. Interest has been stimulated by the award of the Lawson Cup, presented by Squadron Officer Thelma Lawson (now Mrs. C. Raynor), formely Staff Officer in charge of W.R.N.Z.A.F. at R.N.Z.A.F. Headquarters, Wellington.

DISTINCTION IN TRACK AND FIELD EVENTS

As a climax to a successful sporting year, the R.N.Z.A.F. has been distinguished by the selection of Flight Lieutenant J. M. Carr, Dominion hammer-throw champion, to captain the 1954 New Zealand Empire Games team at Vancouver. Further honours have been gained by Leading Aircraftman E. H. Rye, ex-R.A.F. (now serving in the R.N.Z.A.F. at Woodbourne), who this year became the New Zealand marathon champion and 20-mile record holder.

In most other field events, the R.N.Z.A.F. is comparatively weak; and although the interest in boxing and swimming is steady, competition gains have been slight.

Archery, a sport which has twice brought a world championship to the Dominion, is only a recent introduction to the Service. It shows promise of popularity, with postal inter-station competitions soon to be shot out.

FOSTERING THE SPIRIT OF COMPETITION

The enthusiasm for sport throughout the Service finds a natural outlet in annual inter-station events. These culminate in annual Service tournaments, covering both winter and summer sports. Following last year's tournaments, Woodbourne Station, with the best all-round sporting record for the year, was awarded the U.S.A.F. Cup, presented to the R.N.Z.A.F. by the United States Air Force for inter-station competition.

Whenever possible, competition is taken a stage further, through inter-Services tournaments. This year will see a three-Services tournament take place, featuring rugby, soccer, boxing, men's basketball, and women's indoor and outdoor basketball. For the past two years, as well, combined Services teams, in which the R.N.Z.A.F. has been well represented, have played a series of rugby matches against Australian combined Services.

WAITEMATA HARBOUR THE HOME OF YACHTING

Hobsonville, the home station of No. 6 (Territorial) Maritime Reconnaissance Squadron, is also the home of yachting in the R.N.Z.A.F. Situated at

[Photo: N.Z. National Publicity Studios

SPORT IN NEW ZEALAND

While not so plentiful in South Island rivers as in the north, trout nevertheless have a reputation as game fighting fish. In this river, the Clutha, they grow big and wary, and the angler knows that the fish which takes his lure will battle well against all his skill. Deep and swift, the Clutha flows 200 miles through Otago Province, South Island, from Lake Hawea at the south flank of the Southern Alps. Swollen by tributary snow-fed rivers, where it enters the Pacific Ocean the Clutha equals the volume of the River Nile.

the western (inland) end of the landlocked Waitemata Harbour, it is an ideal base for the yachtsman. Good winds and a run of several miles down-harbour past Auckland city on the south side, and picturesque pine covered hills on the north, are some of the inducements which have led to the formation of a strong club. Enthusiasm has waxed with the ownership of club craft, 12 ft. 6 in. sailing dinghies, built to the design of Aircraftman Class 1 J. Spencer. Known as the " R.N.Z.A.F." class sailing dinghy, these are accepted by the Royal Auckland Yachting Club and also given official recognition by the Service.

SPORTSMAN'S PARADISE

Scarcely a New Zealander does not believe he lives in a natural paradise, with hunting, shooting, fishing, and mountaineering facilities almost at the back door and unexcelled by the offerings of any other country. Only experience of other countries can prove this belief true or false; but it remains true, nevertheless, that there is healthy outdoor sport within the reach of almost every able-bodied person in the Dominion.

Always keenly contested annually, winter sports have been fostered by trained mountain guides and ski instructors from overseas, with a great increase in the popularity of ski and alpine clubs. The R.N.Z.A.F. is now closely linked with alpine and tramping clubs through the Search and Rescue Organization, which in emergency calls on all outdoor clubs.

It is in the South Island, ridged down the centre by the giant peaks of the Southern Alps towering to 12,000 feet, that the widest scope is found for tramping and alpine clubs. And at Woodbourne Station, Marlborough Province, is the R.N.Z.A.F. mountain search and rescue team. Exercising regularly in the Marlborough mountains, sometimes venturing into unexplored country, this unit has a considerable number of rescues to its credit. It is composed of tramping and alpine enthusiasts voluntarily recruited from station personnel, and led by Flying Officer B. Hildreth, a scientist and former member of Wildlife Division, Internal Affairs Department. During recent flooding of the Wairau River, which flows through Marlborough, the Woodbourne team rescued more than 60 civilians from inundated areas, and it has in the past assisted Service and civil authorities alike in searches for lost aircraft and trampers.

Although lacking the concentrated scenic richness of the South, the North Island is not without its alpine lures, and has attractive and spectacular ski slopes on bulky 9,000 foot Mount Ruapehu in the centre of the island as well as on symmetrical Mount Egmont out to the west in Taranaki Province. The island has as well some of the best trout fishing waters in the southern hemisphere. It is possible under modern travel conditions for fishermen to leave Auckland or Wellington on a Friday afternoon, spend the weekend on the rivers and lakes under the shadow of Mount Ruapehu, and return to their cities for work on Monday morning.

Such is the case in the South Island also, for ice skating in winter, mountaineering, quinnat salmon fishing in season, and stalking over superb high ranging deer country. A fact strengthening the belief in New Zealand as a sportsman's paradise is that anyone may take game in season throughout the Dominion for the cost of an annual fishing or shooting licence.

CONCERNING PERSONNEL

Among the promotions and appointments of Royal Air Force personnel announced by the Air Ministry since the publication of the Summer Number of AIR POWER, are the following:

PROMOTIONS

(1st July, 1954)

AIR COMMODORE (Acting Air Vice-Marshal) TO AIR VICE-MARSHAL

GENERAL DUTIES BRANCH

J. L. F. Fuller-Good, C.V.O., C.B.E.
J. N. T. Stephenson, C.B.E.
S. R. Ubee, C.B., A.F.C.
F. J. St. G. Braithwaite, C.B.E.
W. J. Crisham, C.B., C.B.E.
P. D. Cracroft, C.B., A.F.C.
H. D. McGregor, C.B., C.B.E., D.S.O.
W. M. L. MacDonald, C.B.E., D.F.C.

GROUP CAPTAIN TO AIR COMMODORE

GENERAL DUTIES BRANCH

H. F. G. Southey, C.B.
E. J. Corbally, C.B.E.
E. S. Butler, O.B.E.
N. C. Hyde, C.B.E.
H. J. Kirkpatrick, C.B.E., D.F.C.
L. E. Jarman, D.F.C.
C. S. Moore, O.B.E.
A. E. Clouston, D.S.O., D.F.C., A.F.C.
G. A. Walker, C.B.E., D.S.O., D.F.C., A.D.C.

TECHNICAL BRANCH

V. D. Morshead.

EQUIPMENT BRANCH

R. C. Storrar, O.B.E.

WING COMMANDER TO GROUP CAPTAIN

GENERAL DUTIES BRANCH

A. R. D. MacDonell, D.F.C.
M. P. C. Corkery, A.F.C.
C. B. E. Burt-Andrews.
G. F. Rodney, D.F.C., A.F.C.
R. C. Love, D.S.O., D.F.C.
C. D. Milne, O.B.E., D.F.C.
M. W. B. Knight, D.F.C.
S. G. Wise, C.B.E., D.F.C.
R. W. Cox, D.S.O., D.F.C., A.F.C.
J. D. T. Revell.
A. C. Brown, D.S.O., O.B.E., D.F.C.
D. H. Burnside, D.S.O., O.B.E., D.F.C.
J. B. Russell, D.S.O.
P. E. Warcup, O.B.E.
G. Lowe, D.F.C., A.F.C.
D. C. Torrens, O.B.E.
P. Burnett, D.S.O., D.F.C.
F. W. Thompson, D.S.O., D.F.C., A.F.C.

TECHNICAL BRANCH

A. L. Holland, B.A.
H. J. Irens, B.Sc.
F. E. Tyndall, B.Sc.

EQUIPMENT BRANCH

T. King.
R. F. Fulley.

SECRETARIAL BRANCH

F. W. Judge.
E. G. Sewell.
G. P. S. Pollard, C.B.E.

MEDICAL BRANCH

W. K. Stewart, C.B.E., A.F.C., B.Sc., M.B., Ch.B.

DENTAL BRANCH

D. J. Malcomson, L.D.S.

NEW APPOINTMENTS

AIR MINISTRY

Air Vice-Marshal W. M. L. MacDonald, C.B.E., D.F.C., as Assistant Chief of Air Staff (Intelligence).

Air Vice-Marshal B. C. Yarde, C.V.O., C.B.E., to be Commandant General of the Royal Air Force Regiment and Inspector of Ground Combat Training.

FIGHTER COMMAND

Air Vice-Marshal G. P. Chamberlain, C.B., O.B.E., as Air Officer in charge of Administration.

Air Commodore M. E. M. Perkins, B.A., A.F.R.Ae.S., as Senior Technical Staff Officer.

COASTAL COMMAND

Air Commodore W. H. Hutton, C.B.E., as Air Officer in charge of Administration.

FLYING TRAINING COMMAND

Air Vice-Marshal H. A. Constantine, C.B., C.B.E., D.S.O., as Air Officer Commanding No. 25 Group.

MARITIME H.Q. CHATHAM

Air Commodore H. F. G. Southey, C.B., as Air Officer Commanding the Royal Air Force Element Maritime Headquarters.

TRANSPORT COMMAND

Air Commodore D. M. T. MacDonald, C.B., as Senior Air Staff Officer.

ROYAL AIR FORCE TECHNICAL COLLEGE

Air Commodore C. L. Dann, O.B.E., as Commandant.

FAR EAST

Air Marshal F. J. Fressanges, C.B., as Commander-in-Chief, Far East Air Force (November, 1954.)

Air Commodore A. E. Clouston, D.S.O., D.F.C., A.F.C., as Air Officer Commanding, Singapore.

MIDDLE EAST

Air Vice-Marshal J. N. T. Stephenson, C.B.E., as Senior Air Staff Officer, Middle East Air Force.

GROUP CAPTAINS' APPOINTMENTS

Group Captain G. N. Amison, to R.A.F. Driffield, to command.

Group Captain P. E. Berryman, C.B.E., to R.A.F. St. Athan, for administrative duties.

Group Captain P. Burnett, D.S.O., D.F.C., to R.A.F. Jurby, to command.

Group Captain G. A. Bolland, C.B.E., to Air Ministry, Dept. of Chief of the Air Staff.

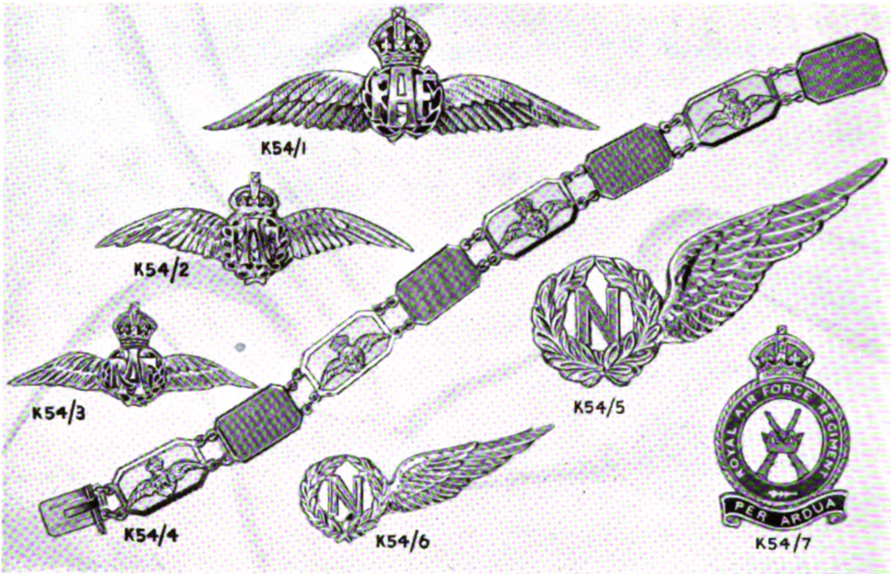
Group Captain C. N. Champion de Crespigny, to H.Q. Fighter Command, air staff duties.

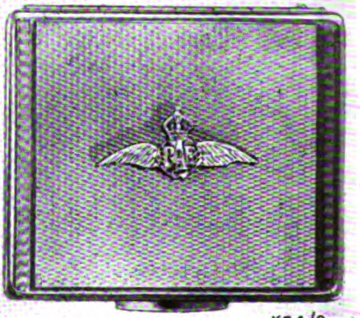
Group Captain J. L. Crosbie, O.B.E., to R.A.F. Ballykelly, to command.

Group Captain G. R. Howie, D.S.O., to H.Q., No. 81 Group, for administrative staff duties.

Group Captain T. I. Iliff, to R.A.F. Seletar, to command.

Group Captain M. W. B. Knight, D.F.C., to H.Q. Fighter Command, for air staff duties.





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K54/3	Silver and enamel wings brooch, span 1¼″. **£1/5/0**; 9 ct. gold, **£5/5/0**
K54/4	Silver R.A.F. Plaque bracelet, length 7½″ (the length can be reduced to individual requirements). **£7/0/0**; 9 ct. gold, **£15/0/0**
K54/5	**Large silver Navigator's wing brooch, span 2″. £2/2/0; 9 ct. gold, £6/15/0**
K54/6	**Small silver Navigator's wing brooch, span 1¼″. £1/18/6; 9 ct. gold, £5/15/0**
K54/7	**Silver and enamel R.A.F. Regiment brooch, £2/2/0; 9 ct. gold, £8/10/0**
K54/8	**Gilt and Chrome Compact, 2½″ × 2¼″, raised R.A.F. Wings. Special automatic Mirror cleaning device. £3/0/0 (one initial engraved free of charge).**

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Group Captain L. G. Levis, to Air Ministry, Dept. of Chief of the Air Staff.

Group Captain G. Lowe, D.F.C., A.F.C., to Air Ministry, Dept. of A.M.S.O.

Group Captain D. Michell, to Air Ministry, Dept. of Chief of the Air Staff.

Group Captain R. A. McMurtrie, D.S.O., D.F.C., to Supreme Allied Commander, Atlantic, for staff duties.

Group Captain D. J. Eayrs, C.B.E., D.F.C., to R.A.F. Cranwell, to command.

Group Captain G. W. Petrie, D.F.C., A.F.C., to R.A.F. Laarbruck, to command.

Group Captain R. D. Pratt, to H.Q., Far East Air Force, for administrative staff duties.

Group Captain T. O. Prickett, D.S.O., D.F.C., to R.A.F. Jever, to command.

Group Captain M. J. Pigott, B.D.S., F.D.S.R.C.S., Q.H.D.S., as Director of Dental Services, Royal Air Force, on retirement of the present Director in 1954.

Group Captain A. J. Shelfoon, A.F.C., to Air H.Q., Iraq, M.E.A.F., for administrative staff duties.

Group Captain J. H. Searby, D.S.O., D.F.C., to National Defence College, Canada, as student.

Group Captain D. F. Spotswood, D.S.O., D.F.C., to R.A.F. Linton-on-Ouse, to command.

Group Captain R. A. T. Stowell, D.F.C., to the War Office, for air staff duties.

Group Captain N. F. Simpson, O.B.E., to R.A.F. Yatesbury, to command.

Group Captain F. M. Thompson, D.S.O., to R.A.F. Station, Luqa, to command.

Group Captain W. T. F. Wightman, D.F.C., to R.A.F. Pembry, to command.

RETIREMENTS

Air Vice-Marshal Sir Francis J. W. Mellersh, K.B.E., A.F.C. (September, 1954).

Air Vice-Marshal G. A. Ballantyne, C.B.E., D.F.C., F.D.S.R.C.S. (Edin.), Q.H.D.S. (December, 1954).

REMINDER TO CONTRIBUTORS

All articles for publication in the January, 1955, number of AIR POWER, must reach the Editor by:

From	(i) Serving personnel	22nd October, 1954.
	(ii) Others	29th October, 1954.

THE ANSWER
TO EUROPE'S AIR DEFENCE PROBLEM

Trends that were unchecked for forty years so increased the size, weight and cost of the standard fighter and the difficulties of its design, production and operation, that few countries have the resources to build or buy the fighters they need for their defence. A halt has now been called and a new trend started by the Folland Gnat, a light jet fighter with a flying and fighting performance that meets the sternest demands of modern war and provides the answer to Europe's air defence problem.

The following comparisons with the standard fighter illustrate some of the more significant merits of this new type of aircraft.

● **MAN-HOURS**
Tooling time for production is halved, and twenty-five light fighters instead of five standard fighters can be built in the same number of airframe man-hours.

● **COST**
Twenty light fighters, fitted with all essential flying, navigational and armament equipment, can be built for the price of six standard fighters.

● **FIRE-POWER**
The five light fighters produced in the time needed for one standard fighter can bring to bear 10 × 30-mm. cannon instead of the 4 × 30-mm. cannon, or 6 × 0·5-in. machine-guns of the standard fighter.

● **HANDLING**
With its high thrust-weight ratio, powered controls, and low lateral inertia, the light fighter will have outstanding manœuvrability. Pilots can learn to fly it in less time because of its simplicity and handiness.

● **SERVICING**
The simplicity of aircraft services and the smaller amount of equipment installed cut servicing time and increase operational strength. All items needing routine attention are sited where they can be reached without trestles or staging.

● **MOBILITY**
Light fighters can be carried by air freighter, ship or lorry with little or no dismantling, and can be given ample flight duration for ferrying by the use of long-range tanks.

The Gnat and its first prototype, the Midge (pictured above), are private ventures by

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BOOK REVIEWS

Strategy for the West. By Marshal of the R.A.F. Sir John Slessor, G.C.B., D.S.O., M.C. (Cassell & Co., London. 162 pp. June, 1954. 9s. 6d.).

The personal views expressed in this excellent book carry a wealth of experience behind them from the appointments held by the author, giving Sir John a sound overall picture of the subject. As Commandant of the Imperial Defence College, which exists to train senior officers of the Commonwealth fighting services, and senior civilian officials, in the broadest aspects of imperial strategy and for three years recently as Chief of the Air Staff, Royal Air Force, he had a unique opportunity to study these problems.

This was enhanced by his close collaboration with U.S.A. in matters connected with our common defence strategy, as well as his close contact with the leaders of our Government who formulated our policy. His views are clearly and forcefully expressed, yet written in an easy style which makes a basically Service subject interesting reading for civilians and Service personnel alike.

The hopes expressed in the Author's Note that "it may contribute to an objective appraisal of the true military situation in a critical period of history, and particularly to a wider understanding of the overriding influence of air power on the problems of the age we live in" will certainly be fulfilled by this most interesting book, which is based on a series of lectures delivered at War and Staff Colleges in the United Kingdom, the United States and Canada in the summer and autumn of 1953.

He does not spare his punches when, in some respects, he challenges American statesmanship as well as our own. Sir John does more than dwell on the major dangers which threaten the peace of the World, he gives us carefully considered views of the action which should be taken to counter them. "Strategy for the West" has a worldwide interest and Service personnel particularly will find material to help them in their study of Western strategy as well as the carefully considered opinions of one who has unrivalled up-to-date knowledge of politico-military problems.

It was with the greatest regret that we were not able to recommend this book to our readers in our July number, which had unfortunately gone to press just before it was published. We do so now with the greatest confidence. A. H. S.

600 Questions and Answers on Air Force Law (10th Revised Edition). By Group Captain H. M. Shurlock, O.B.E., R.A.F. (Gale and Polden Ltd., Aldershot. 136 pp. with useful reference index. 10s. 6d.).

The author is the Deputy Director of Legal Services, Royal Air Force, and of Lincoln's Inn, Barrister-at-Law; his position as an authority upon Air Force Law, enabled him to provide serving officers of the Royal Air Force with this excellent book in 1939 and this new revised edition will be welcome to those whose professional duties necessitate, not only a study of Air Force Law, but a handy reference book at their elbow to answer many of the conundrums that arise when administering it.

From experience gained in lecturing to officers, the author found that the chief problem that confronted them was the difficulty of ascertaining from amongst the various sources of Air Force Law the solution of sundry legal problems that arise in the course of their duties and the authority by which they may take any action that may be appropriate.

The questions have been handily grouped for quick reference and where there is an authority supporting the answer it is quoted.

Although this book is not an official publication it is nevertheless compiled by one whose appointment well qualifies him to give authoritative answers to the 600 questions selected as those most likely to arise in the course of daily duties.

Since the publication of the first edition some fifteen years ago, it has been most helpful to officers, both in assisting them in studying for their promotion examinations, as well as a handy book of reference and practical guide in the administration of Air Force Law.

Having personal knowledge of the usefulness of this book, on the many occasions that the reviewer has had to act for the Prosecution, Defence and in the Middle East as D.J.A.G., it is with the greatest confidence that it is recommended to Royal Air Force Officers. A. H. S.

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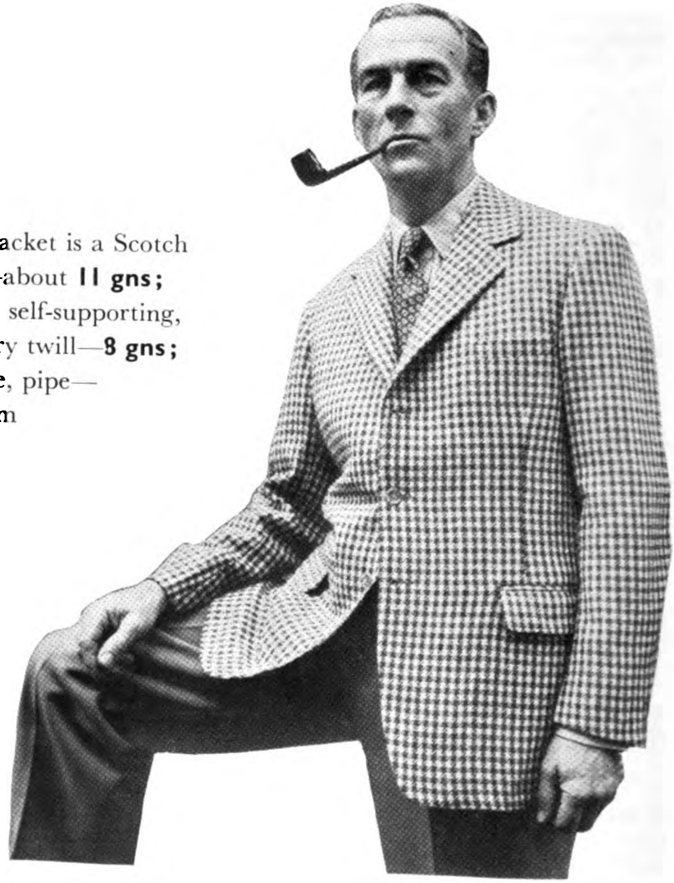

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Slide Rule. By Nevil Shute. (William Heinemann Ltd., 99 Great Russell Street, London, W.C.1. 249 pp. Illustrated. 18s.).

Nevil Shute Norway has achieved fame both as an engineer and as an author. Consequently, he had a double obligation to readers when planning his autobiography, because he must have known that many young engineers and writers would look up to his successful career as a model for their own.

For that reason, we feel that, in places, he should have been more careful not to let personal prejudices cloud his reasoning. In particular, we disagree that the 1920s and '30s were the halcyon days of aviation, never to return, because "aeroplanes were small and easily built so that experiments were cheap and new designs could fly within six months of the first glimmer in the mind of the designer". Surely for youth there was more excitement in trying to fly well in the old "stick-and-string" days when every take-off was an adventure, and when any new ideas might change the whole future of the aeroplane? And has there not been plenty of excitement and adventure since the war, with the "sound barrier" to overcome and other immense new challenges to the ingenuity of designers and the skill of test pilots?

Nor do we think he is wise in writing that "a politician or a civil servant is still to me an arrogant fool till he is proved otherwise", even if civil servants did bear so much of the responsibility for the disastrous affair of the R.101 airship, the tragic story of which—together with that of the R.100—fills nearly two-fifths of *Slide Rule*.

Apart from such controversial remarks and a rather more untidy style than we expect from Nevil Shute the writer, the book is full of interest. He is far too good an author to fill the pages with the sort of fond reminiscences that interest only maiden aunts, and in many places his own story is secondary to an extremely forthright account of Britain's between-wars airship programme, in which he played an important part, and of the birth and growth of the Airspeed company, which N. S. Norway the engineer launched with little capital beyond the loyal help of a few friends and a promise from Sir Alan Cobham of an order for two light transport aircraft.

The author produces plenty of evidence to support his contention that "nationalized" undertakings such as the Royal Aircraft Factory in 1912-15 and the Cardington Airship Works in 1929-30 can never be as efficient as private enterprise. He reminds readers of the contribution to victory in the Battle of Britain made by private aerodrome owners, who trained many of the pilots who flew the Hurricanes and Spitfires and also enabled new companies like Airspeed to find workshop and hangar accommodation at a rent they could afford—two aspects which the Air Ministry should bear in mind now that the closing of the Reserve Flying Schools is crippling many of those same airfields. Nevil Shute's own story underlines the equally sorry truth that the aircraft industry has lost, and is still losing some of its best and most enthusiastic young engineers to more lucrative professions. J. W. R. T.

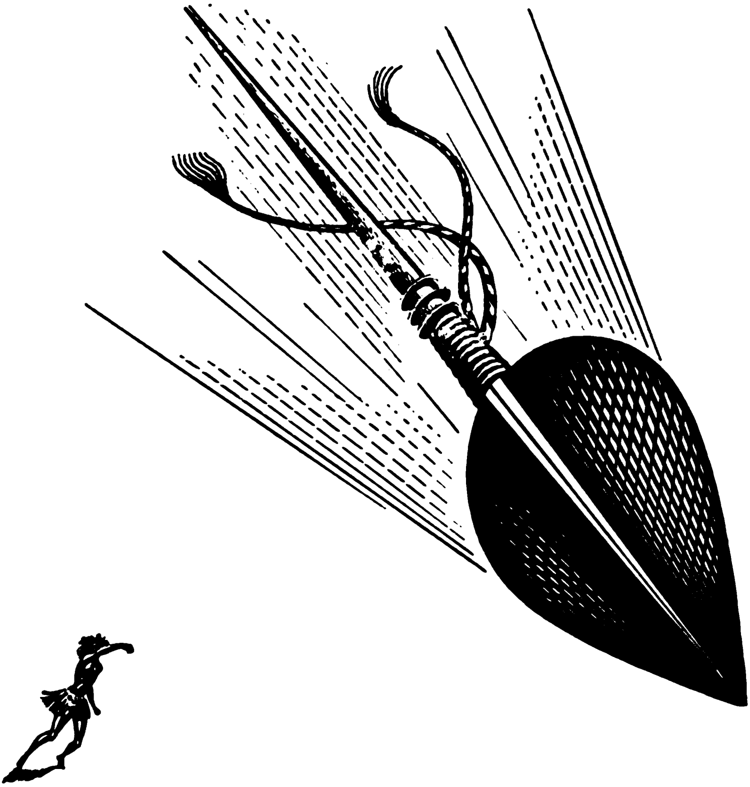
Tiger Squadron. By Wing Commander Ira (Taffy) Jones, D.S.O., M.C., D.F.C., M.M. (W. H. Allen & Co. Ltd., Essex Street, London, W.C.2. 295 pp. Illustrated. 15s.).

What makes a fighter squadron great? "Taffy" Jones has no doubts, and neither will the readers of his book.

No. 74 Squadron of the Royal Air Force—the "Tiger" Squadron—was not formed until March 1918; but in the remaining eight months of the 1914-18 War its pilots—flying S.E.5s—destroyed 140 enemy aircraft and sent down a further 85 out of control, for a loss of 15 pilots killed or taken prisoner. In the Battle of Britain period of the second World War, between August and November 1940, the second generation of "Tigers", in their Spitfires, destroyed at least 84 enemy aircraft and damaged many more.

During these two periods of air combat the squadron was led respectively by Major E. (Mick) Mannock, whose tally of 73 victories made him the top-scoring British fighter pilot of the 1914-18 War, and Wing Commander A. G. (Sailor) Malan who, with 30 victories, topped Fighter Command's list of "aces" from 1940 until August 1944, when he had been off operations for two years.

Although separated by 22 years, these two men had much in common, and it was their leadership and spirited example that inspired the squadron's successes, which are described in detail in this book. Both were superb marksmen, and both preferred and taught carefully-planned tactics in air combat rather than mere hit-or-miss free for all dog-fighting. Indeed, if we study Mannock's rules for air fighting and the famous "Ten Rules" of Malan, circulated in 1942, they have much in common, although fighter speeds had almost doubled in the meantime.



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In general, they are equally applicable now, despite a further doubling of speeds—the golden rules being that "Height gives *you* the initiative", "Wait until you see the whites of his eyes" and then "Go in quickly, punch hard, and get out". So the young fighter pilots of today, with their sleek, complex jets, can still learn quite a lot from the great fighters of the past, many of whom, like "Taffy" Jones himself, served with the "Tigers".

Inevitably, the section of the book dealing with the 1914-18 War is more personal and exciting than the later chapters, because it is based on the author's own diary, written in the field during the months when he disposed of 40 enemy aircraft. It is a pity too that his record of No. 74 squadron ends in 1940 and is often interwoven confusedly with the stories of other units. But *Tiger Squadron* is intended as a tribute to one of the greatest fighting units of the world's finest air force, rather than as great literature, and in this it succeeds admirably. J. W. R. T.

V.2. By Major-General Walter Dornberger. (Hurst and Blackett Ltd., Stratford Place, London, W.1. 264 pp. Illustrated. 16s.).

When the first V.2 rocket fell on England in the Autumn of 1944, it opened the age of what we now call "push button warfare". It was preceded by the V.1 flying bomb, but, although ingenious, this was merely a pilotless aeroplane. V.2 was different. Its speed and climb far exceeded anything previously built by man. Its design and successful development resulted from the teamwork of engineers from a dozen different branches of science. It was something altogether new and formidable. Something against which there was, and is, no defence short of the complete destruction or capture of its assembly factories and launching areas.

Major-General Dornberger, scientist and soldier, was in charge of the entire V.2 project at Peenemunde experimental station, and in this book he tells its story as only he could tell it. It is a fantastic story, set in the tragic "Alice in Wonderland" atmosphere of wartime Germany, when the destiny of nations revolved around the whims of a superstitious, unbalanced Führer and his generals, of whom there are frightening portraits in this book.

Apparently Hitler dreamed in March, 1943, that no A.4 (Aggregate 4, the correct designation of V.2) would ever reach England, although one had been fired with complete success on 3rd October, 1942. So Peenemunde received no priority for materials and labour for four months. When it was restored to top priority in the German armaments programme on 7th July, 1943, it had only six weeks' respite before Bomber Command made its famous attack on the experimental station, killing more than 700 persons, including Dr. Thiel, brilliant head of the Research Branch of the German Army Weapons Department, and causing further serious delay.

As if this were not enough, the grim figure of Heinrich Himmler next appeared on the scene, and the struggle for control of the V.2 project was intensified. Key men were removed from their jobs; even Dr. von Braun, the head of design, was arrested on a trumped-up charge of treason.

Despite all these things, V.2 gradually developed into a usable and reasonably accurate weapon—perhaps the only real offensive weapon left to Germany, except for her hard-pressed U-boat fleet. And to follow V.2 were even more formidable weapons—the A.9/A.10 long-range rocket designed to hit New York, the *Wasserfall* guided anti-aircraft rocket, small missiles that could be fired from submerged submarines. Indeed there seemed no end to the ingenuity of Dornberger's design team or to the offensive potential of the rocket.

Fortunately for the Western Allies, the war was already lost for Germany when the first operational V.2 was fired. But the danger has not passed, for Peenemunde and many of its scientists passed into the Russian Zone of Germany after the war and there is no knowing what further development has taken place behind the Iron Curtain.

We in the West seem to have been far too slow in utilizing some of the advanced wartime products of German military science, and a U.S.A.F. expert is reported to have said in 1951 that "if we had wanted an operational rocket in 1945 we should have used V.2. If we wanted one today we should again use V.2. And I am afraid that if we need one in a few years' time, we shall still use V.2". There could be no better tribute to the achievements of Dornberger and Company, or clearer admission of the vast technical problems inevitable in the perfection of guided weapons.

J. W. R. T.

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The Sound Barrier. By Neville Duke and Edward Lanchbery. (Cassell & Co. Ltd., London. 129 pp. with 27 illustrations, 12 diagrams and useful reference Index. 8s. 6d. net: 19th August, 1954).

This is the sixth edition of this book. Since publication of the first edition in August, 1953, the advance in aeronautical design has been rapid. There have been many changes in wing design, new power units, etc., giving higher speeds and improved performance of aircraft, so much so that the first edition might almost be termed "out-of-date".

This revised and enlarged edition not only brings readers up-to-date in the progress made in twelve months, but again gives us speculation, by those best informed to predict the future, upon "Things to Come", which covers future development in design, exploration of the upper air, discusses the gap between aeroplanes and guided missiles and the reality of time as a fourth dimension.

Already the sound barrier is commonplace and has ceased to be a problem of flight and supersonic aircraft are in normal production. This new edition goes further and deals with the present-day problem to be solved by designers—the "heat barrier".

This is a reference book packed with knowledge of the technical and historical aspects of high-speed flight. Although not essential, it is an advantage to have a basic understanding of aerodynamic formulae and terminology in following the explanations of the problems facing designers of modern aircraft. In the historical build-up of jet development a regular procession of engines and aircraft are passed before the reader with brief accounts of the outstanding features of each.

The book is in four parts: Part I, Supersonic and High Altitude Flying; Part II Design for Speed, (i) Engines, (ii) Aircraft, (iii) Pilot; Part III, Design for Use (bombers, fighters and civil airlines); Part IV, Things to Come.

The launching of the atom-powered submarine U.S.S. *Nautilus*, years before such possibility was anticipated has removed from the realms of Jules Verne or H. G. Wells the prospect of atom-propelled aircraft. Such experts as Gordon Dean predicted large airliners driven by atomic power by 1963 ("Report on the Atom, 1953". Eyre & Spottiswoode), but with the lessons learned in this submarine's development and now being applied to this purpose, atomic powered aircraft may be heard of earlier than his prediction.

With the astonishing progress in America with the "V.T.O." fighter development programme, we should like to have seen this covered more extensively, but as the first successful full-scale tests only took place at about the time of this book's publication, pre-information was probably restricted.

Realizing that throughout this book emphasis lies in American progress, the authors have, in our view rather naively, pointed out in their preface to the sixth edition that the United States releases news of its developments at an earlier stage than Britain, who will not admit the existence of a new aircraft until it has appeared in the sky.

Sound Barrier is a remarkably clear exposition of current aeronautical development even as recent as the new supersonic British fighter built by English Electric with a level speed far beyond that of sound, it has even had a speed of 1,000 m.p.h. attributed to it. When reading this book one is mindful of the hazards and risks undertaken by test pilots of modern aircraft. A. H. S.

The two authors are both ex-Royal Air Force, the ex-bomber navigator, Edward Lanchbery perhaps not quite so well known to R.A.F. personnel as his co-author, Neville Duke, Hawker's chief test pilot since 1951, *who is not only known for his cool, calculated courage in testing every type of modern high-speed aircraft or his record-breaking flights, but also as a Battle of Britain pilot with* 28 *enemy aircraft destroyed, with the D.S.O. and D.F.C. and two bars and the Czech military cross. To this he now adds to the debt of this country to him, by his personal contribution to our struggles to produce types of aircraft which will give us superiority in the air, now and in the future.*

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NEW BOOKS

SECOND WORLD WAR

The Second World War, Vol. VI. By Sir Winston Churchill. "Triumph and Tragedy"—the final volume. (716 pp. Cassell. 30s.).

The War at Sea, Vol. I. By Captain S. W. Roskill, R.N. "The Defensive"—the first of three volumes of the official history of the maritime war 1939-1945. (History of the Second World War, United Kingdom Military Series. H.M.S.O. 42s.).

Skis against the Atom. By Knut Hankelid (The author was the leader of the Norwegian raid on the German heavy-water plant at Rjukan), with an introduction by Major-General Sir Colin Gubbins. (Kimber. 15s.).

L'Operation Jericho. By Remy. The story of the Amiens prison raid of 18th February, 1944, with foreword by Colonel Livry-Level (in French). (Paris Editions. France, Empire. 585 Francs).

Swastika at Sea. By C. O. Bekker. The struggle and destruction of the German Navy, 1939-1945. (Kimber. 15s.).

German Military Intelligence. By Paul Leverkuehn. An account of the Wehrmacht's Secret Service in the Second World War. (Weidenfeld and Nicholson. 16s.).

N.A.T.O.

N.A.T.O. and its Prospects. By Wing Commander J. D. Warne. A Study of the Defence Organization for Western Europe. (The Army Quarterly Series). (William Clowes).

FAR EAST

The War in Korea, 1950-1953. By Major R. C. W. Thomas. (Gale & Polden. 10s. 6d.).

India and the Awakening East. By Eleanor Roosevelt. (Hutchinson. 15s.).

MIDDLE EAST

Oil in the Middle East: (Its Discovery and Development). By Stephen H. Longrigg. (Oxford University Press. 25s.).

The Sudan. By Sir Harold MacMichael. (Ernest Benn. 21s.).

U.S.S.R.

The Prophet Armed: Trotsky 1879-1921. By Isaac Deutscher. (Oxford University Press. 30s.).

Russia and the Weimar Republic. By Lionel Kuchan. (Cambridge, Bowes & Bowes. 25s.).

MATHEMATICS

Mathematics in Action. By Dr. O. G. Sutton (Director of the Meteorological Office). A book on applied mathematics with chapters on Ballistics, the Theory of Flight, Statistics and Meteorology. (Bell. 16s.).

MILITARY

Strategy for the West. By Marshal of the R.A.F. Sir John Slessor. (Based on lectures given by the author in the United Kingdom, in the U.S.A. and in Canada in the summer and autumn of 1953). (162 pp. Cassell. 9s. 6d.).

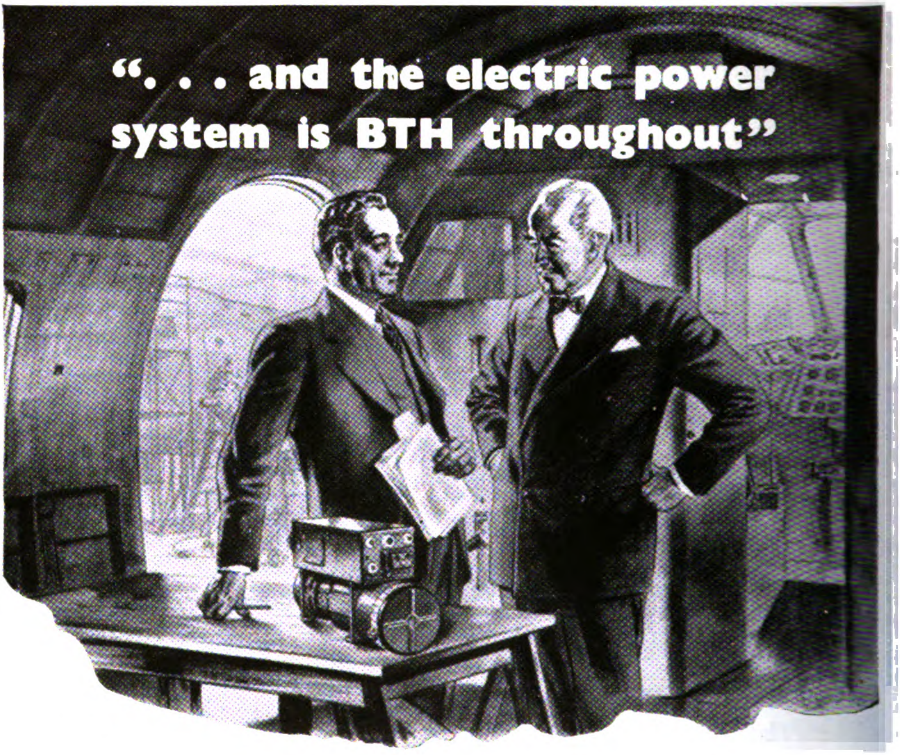
BOOKS RECEIVED TOO LATE FOR REVIEW IN THIS NUMBER

Royal Air Force, 1939-1945, Vol. III, "The Fight is On." By Hilary St. George Saunders. (439 pp., 25 illustrations and 21 maps and diagrams. H.M.S.O., London. 13s. 6d. net.).

Development of the Guided Missile: Second Edition. By Kenneth W. Gatland, F.R.A.S. (292 pp.: Fully illustrated. Iliffe, London. 15s. net.).

The Dangerous Skies. By Air Commodore A. E. Clouston, D.S.O., D.F.C., A.F.C. (187 pp., 24 illustrations. Cassell, London. 13s. 6d. net.).

It is hoped to review these books fully in our next number.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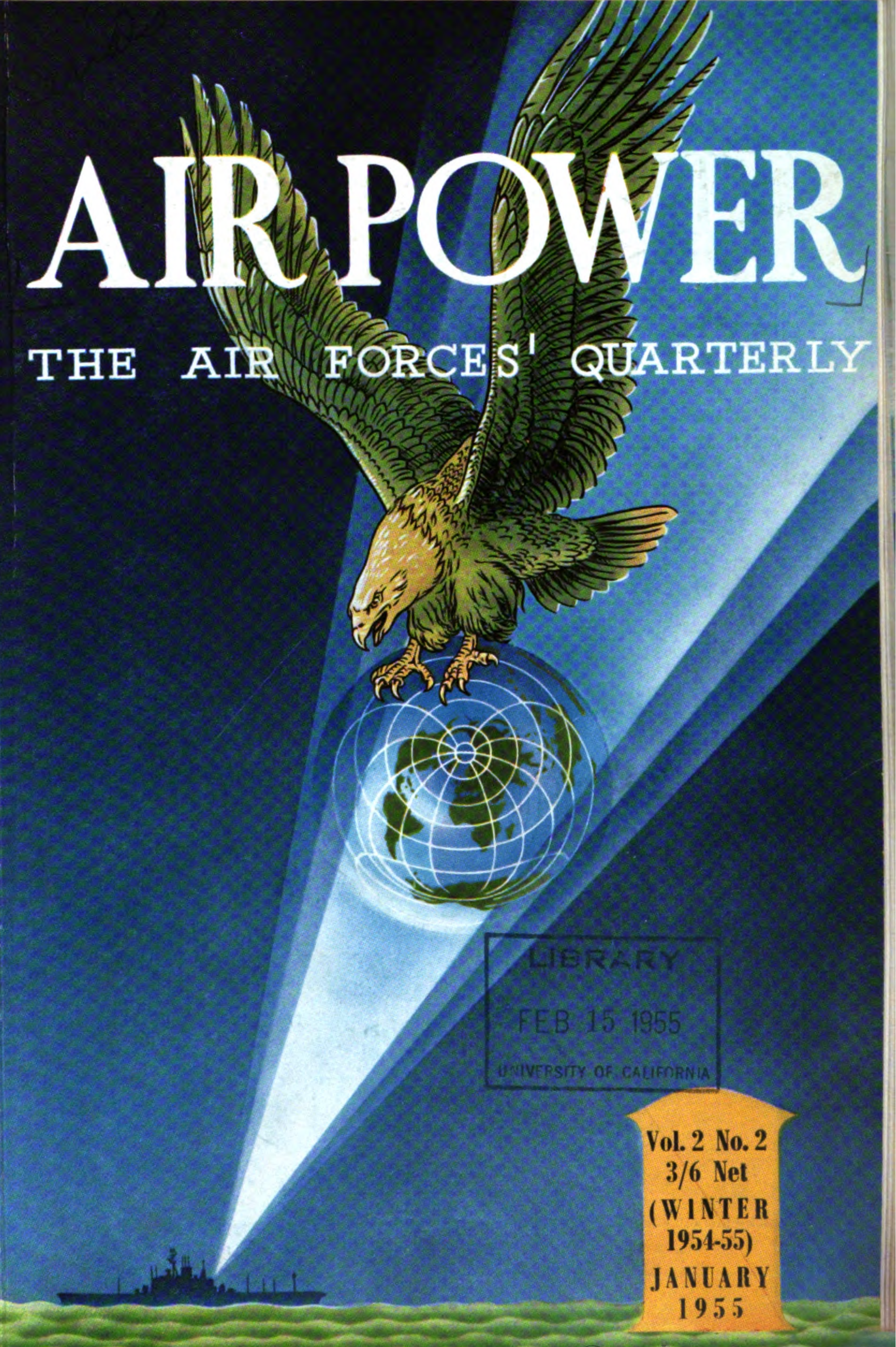

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AIRCRAFT v SUBMARINE

IN THE EARLY YEARS of the last war the submarine demonstrated its power: the attrition of supply fleets was enormous. Yet whilst the necessity to keep our sea lanes of supply open remains as vital today as ever, by modern standards the last-war submarines were slow, short-ranged and fought with crude weapons. Ocean going submarines today displace some 1,500 tons, have crossed the Atlantic and Pacific without surfacing and are capable of speeds in excess of 20 knots whilst submerged. They can dive to greater depths in a shorter time, and carry acoustic and sinuous trajectory long-range torpedoes and various novel offensive and defensive homing weapons, some of which may be released whilst submerged, rise to the surface, take to the air and home onto an attacking aircraft with the speed of a shell.

But comparably with the advance of submarine development, the effectiveness of anti-submarine aircraft has also greatly improved since the war. Modern centimetric radar can get an echo from the body of a submarine's snorkel breathing tube, small though it is. Magnetic airborne detection equipment can discern the presence of a submerged submarine from the local change its hull makes to the earth's magnetic field. The sonobuoy is a float that can be dropped from the air and when it reaches the surface it lowers a microphone and listens. The transmitted recordings from a battery of sonobuoys dropped near the submarine can be used to plot its under-water track. Another detection method of particular use with helicopters is Dipping Asdic. Once the speed and heading are known the submarine can be attacked from the air using a number of different types of projectile. One method is to lay down a barrage of small mines which sink and explode on contact. Any one that touches the hull can blow a hole in it big enough to be fatal. Depth charges can be used. There is also a type of guided weapon that can both fly and propel itself under-water to find its way to the submarine by the shortest air and sea route. The electronic guidance system in missiles from the submarine that rise up out of the sea to attack the aircraft can be jammed from the air or if they use a proximity fuse the mechanism can be pre-detonated harmlessly.

There are three classes of anti-submarine aircraft: (i) the long range land-plane able to span the Atlantic from bases on either side; (ii) the carrier-based patrol aircraft for certain remote areas in the Pacific and for standing patrols over convoys; and (iii) the medium or large sized helicopter operating from merchant ships or naval escort vessels. At Bristol we are concerned with the first and last of these categories: a maritime reconnaissance version of our Britannia airliner is being built for the Royal Canadian Air Force by Canadair Limited in Montreal, and we have a large production programme for twin-engined twin-rotor helicopters capable of carrying the various special detection equipment and offensive weapons required for modern anti-submarine warfare.

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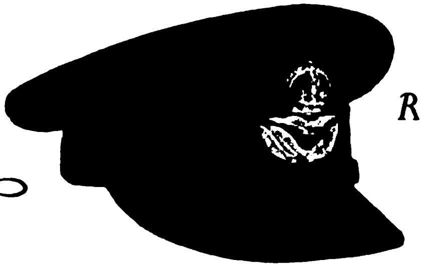

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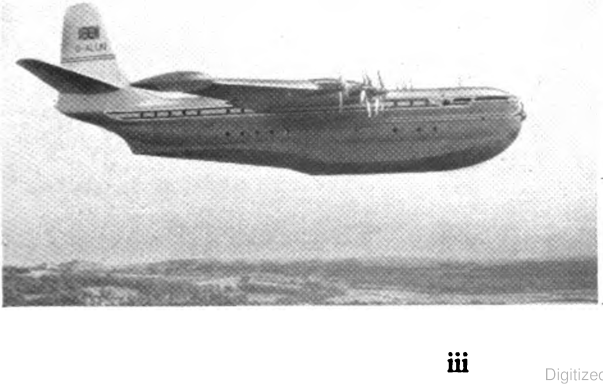

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LIST OF ILLUSTRATIONS

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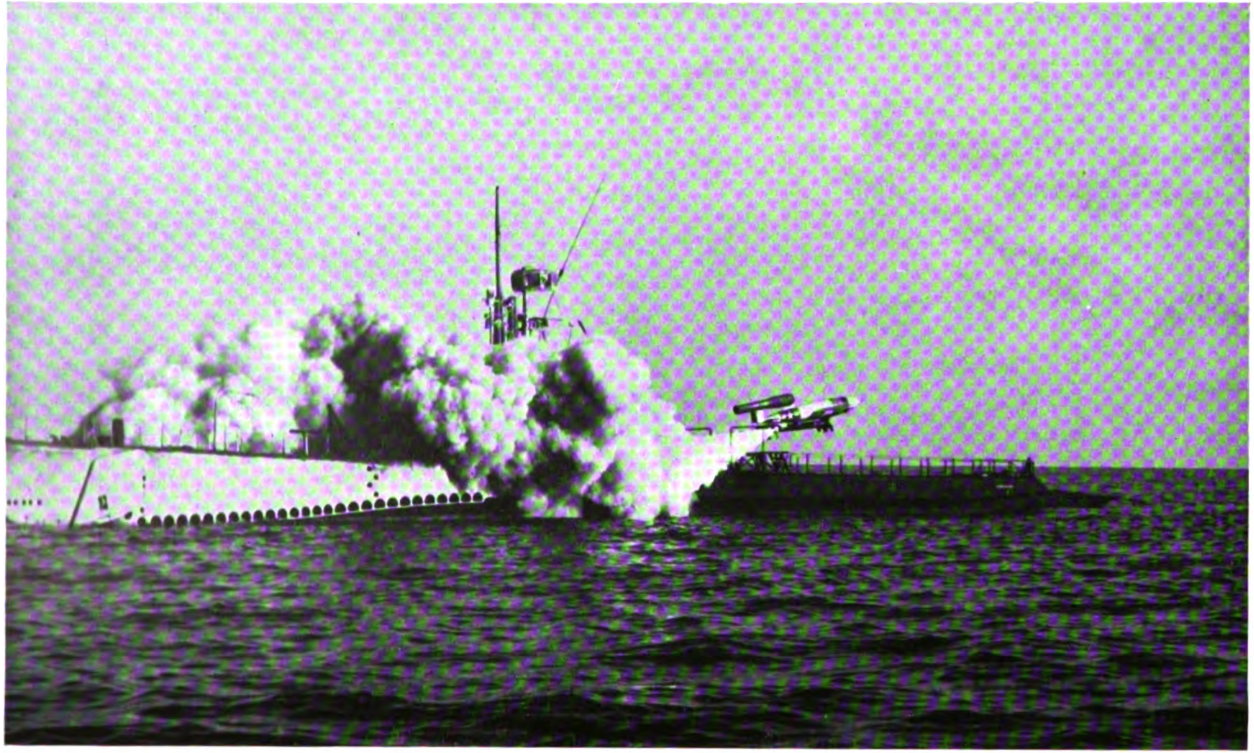

THE SUBMARINE U.S.S. "CARBONERO" LAUNCHES A GUIDED MISSILE

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EDITORIAL

LOOKING AHEAD

IN the New Year it is customary for us to look to the future, rather than the present. We therefore propose to indulge in some speculation on developments in air power and, when doing so, hope that we shall not draw criticism from those who prefer the more conservative and safer practice of writing on conventional aircraft and armaments, or at least those definitely accepted as available for our present defence scheme. Because of Britain's usefulness as a forward base for operations against Russia in any global war, her destruction would be the Soviet's first objective. Unlike America, which is some 4,000 miles from the nearest U.S.S.R. base, Britain cannot be defended from air attack in great depth, London being only 600 miles (one hour's flying time) from Soviet bases in East Germany and, furthermore, with our high-density population and the nearness of our key industrial centres to these bases, we are a reasonably easy target. Nevertheless, our now improved and strengthened air defences would take a very heavy toll of bombers, not only making it a costly business, but probably defeating the aim of the attack. Anticipating this, is it not probable that Russia is contemplating other means, either alternative to or in conjunction with bombers, for neutralizing this country?

A quick survey of U.S.S.R. potentialities for long-range rocket development is sufficient to justify the suggestion that she might launch an equally devastating attack by these weapons, which would require totally different, or at least serious adjustment, of any defence plans confined to attacks by conventional bombers. Although expendable weapons, five could be produced in the same time as one bomber, and each for about one-sixth of the cost. Aircraft and skilled aircrews could be diverted to more distant targets. There is little doubt that the V-2 type rocket has been developed to carry an atomic warhead and much has been done to improve its accuracy. Should Soviet armies succeed in occupying the Low Countries, new-type rockets would face our air defence with a very grave problem in a future war. We managed to "bend the beam" in the last war; if our scientists could bend it a bit further, those dispatching rockets might get an unpleasant surprise.

Vertical take-off interceptor aircraft have reached a stage in their development which permits some speculation as to the possible changes that they could cause in conventional aviation generally. Primarily developed for reducing the time required to intercept enemy aircraft, they obviously need not be confined to the defence of towns, factories or aerodromes. By adapting the larger merchant vessels, so that each could carry a V.T.O. interceptor fighter. with a greatly increased number of small, fast aircraft carriers also carrying a few of this type aircraft, this would seem a solution to the present debatable practice of exposing a very large number of more costly aircraft to total loss by the sinking of one large "Fleet Carrier."

The further development of V.T.O. aircraft might conceivably lead to the gradual reduction in the number of the immense aerodromes and miles of concrete runways which now cover large areas of this country, leaving only a few for very big transport aircraft driven by atomic power.

Remembering Sir Frank Whittle's difficulty in obtaining financial support from the Government in the experimental stages of his jet engine, we cannot but wonder whether we are giving the help that we should to the present development of the Folland "Gnat" Lightweight Fighter. Although not so revolutionary as the invention of the jet engine, it would seem that, subject to results of performance tests, this small aircraft, with a suitable engine, could be allocated its place in our air defence. With even the recently proposed enormous reductions in defence costs, they are, and will continue to be, a heavy strain on our national resources; therefore, if the "Gnat" could replace, with equal efficiency, the larger and more expensive fighters, even for some of their functions, on economy grounds alone it has a claim for Government support, instead of leaving its development to private enterprise.

Again, on the principle of "not carrying all our eggs in one basket," would it not be possible to build a number of smaller and much faster aircraft carriers, each with a squadron of these small lightweight fighters, supplementary to the present large "Fleet Carriers"? The larger ships are an attractive target for atomic attack, which, if successful, would leave the whole convoy without air cover, whereas, with a number of these smaller "Gnat"-armed carriers available, this danger would not exist in the same degree.

Such speculation on the possibilities of the future might make it appear that our present defensive reasoning is based on outmoded concepts of air warfare, *but to return to the realms of what is practical,* it is obvious that any such plans must be based upon the weapons immediately available, or likely to be so in reasonable numbers in the near future.

THE DEFENCE TEAM

In *Brasseys Annual, 1954,* Rear-Admiral H. G. Thursfield contributes a most interesting article under the title "The Defence Team," in which we were glad to see that he emphasizes the vital need for unity of the three Services.

He deprecates, as we all do, the spate of letters in widely read newspapers, by vociferous, self-appointed strategists, which foster inter-Service controversies to the detriment of such sadly needed unity.

It is unfortunate that the only examples that the author quotes are those from protagonists of the Air Force, whereas of late, if not over a longer period, the bulk of these letters have been from self-appointed champions of the Navy or Army, which might convey to some the unfortunate impression that his article is not without some bias in favour of the older Services.

We agree with him that it is a great pity that protagonists of any of the three Services should air their views in the public Press, whether it be to provide propaganda for this or that Service, or merely instigated by self-importance.

What is equally disturbing is that, not content with stirring up discord between the Services, they should cast aspersions on men of great integrity and devotion to duty. When such attacks are made by senior officers of our defence team against those responsible for our defence policy, it is more than disturbing, it is deplorable.*

That the opening paragraphs of his excellent article should have been marred by any suspicion of bias is unfortunate, because the author puts forward some very interesting arguments and provides useful material for constructive debate on the use of both "Sea Power" and "Air Power" in any future war.

In conclusion, we suggest that such constructive criticism on Service matters, even if slightly controversial, is acceptable in Service journals, as it stimulates helpful discussion on defence problems by those who understand them. We agree with him that acrimonious letters by self-appointed protagonists in the widely read newspapers serve no useful purpose and, what is worse, endanger the unity of our "Defence Team."

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* The *Daily Telegraph* of 25th and 26th October, 1954.

AIR POWER AND WORLD STRATEGY TODAY

By Marshal of the R.A.F. Sir John Slessor, G.C.B., D.S.O., M.C.*

THERE is an old military axiom that the weapons of war change but the great principles of war remain unchanged. Up to a point that is still true; but it must be supplemented, if we are to think realistically about world strategy today, by recognition of a fact of enormous significance—the fact of the revolution in human affairs which has been brought about by the rise of air power and the development of the atomic and thermo-nuclear weapon. Hitherto the weapons of war have been used and the principles of war have been applied upon the battlefield. Quite recently—within the lifetime of our children not yet of university age—we have seen the battlefield begin to lose its significance; or perhaps it would be more accurate to say that we have seen whole countries become a battlefield. We have actually seen in the green fields of England and the industrial cities of Germany and Japan that "ghastly dew from the nations' airy navies battling in the central blue" that Tennyson imagined in Queen Victoria's reign. We have felt the impact of a new portent, the robot pilotless aircraft or guided missile, the V1 and V2 that fell upon England ten years ago. And now we have reached the consummation of the new revolution, in the atomic and the hydrogen bomb.

This great turning point in history has been reached surprisingly quickly, as history is measured. It is only just over fifty years since a man first hoisted himself off the ground in a powered machine. Like most revolutionary inventions, this one had a rough passage to begin with. The British Admiralty were offered Wright's patents in 1907: "I regret to have to tell you," wrote the First Lord, "after the careful consideration of my Board, that the Admiralty while thanking you for so kindly bringing the proposals to their notice, are of opinion that they would not be of any practical value to the Naval Service." Said a well-known American General less than forty years ago, "I see no reason why the range of a military aeroplane should ever exceed three days' march by the infantry." This attitude of scepticism persisted, though in diminishing degree, over many years. It was nourished by the extent to which some early airmen went to the other extreme and overcalled their hands—though of that it was also to some extent the cause. In the closing years of World War II the achievements of air power surpassed the claims of all but the few extreme protagonists in earlier days. Today, paradoxically enough, only fifty years after Wright's first venture in controlled flight, the popular tendency against which we should be on our guard is to expect too much of air power—to regard it as a panacea, a short cut to world peace and security. But another paradox is that its terrible ultimate development need not lead to the destruction of civilization, but holds out a message of hope—the hope that, in President Eisenhower's words, "the miraculous inventiveness of man shall not be dedicated to his death but consecrated to his life." Sir Winston Churchill has said, "It is to the universality of potential destruction that we may look with hope and even with confidence."

To speak of the ultimate development of air power is not to make the absurd claim that aircraft, with or without human crews, have reached the peak of their performance. The modern jet-propelled bombers may perhaps be the last of their line; but they will be replaced by the pilotless bomber—the long-range controlled missile of tomorrow. No doubt bigger and more destructive weapons could be designed than the hydrogen bombs we now have. But it seems doubtful that they need be made. That which we have is big enough and its effect on the issues of war and peace decisive. We have in fact reached the practical ultimate instrument of mutual destruction. We have at last arrived at the point when war—in the sense of total world war as we have known it in our generation—has abolished itself as a practical instrument of policy.

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* Republished by permission from *Foreign Affairs*, New York, October, 1954.

There is nothing new about total war—it was not new in the days of Genghis Khan or Attila. But in our day we have seen science and technology reduce the world to the size of a Hellenic city State. And where in the dawn of history the innocent victims of total war were numbered in hundreds, in the late war they were numbered in millions. Another time they might be numbered in hundreds of millions—*and everybody knows it,* the men in the Kremlin as well as anybody else.

This is on the assumption—which must surely be accepted—that the weapon of mass destruction would certainly be used in any great war between major Powers. That assumption will scarcely be questioned in the United States—indeed it forms the basis of their military policy. The British Government in their "Statement on Defence" of last February say that "it must be assumed that atomic weapons would be employed by both sides" in another global war. The Leader of the Opposition, Mr. Attlee, said in a broadcast this June: "The fact is that once there is war, absolute war, in the modern age, and if the existence of a nation is at stake, any weapon will be used in the last resort." It is hardly necessary to say that this issue is far from simple or straightforward, particularly for Great Britain in her exposed position, with her teeming cities and the great ports through which her life blood is pumped. If ever we came to the brink of total war, the statesmen of the free world would be faced with an appalling decision. Mr. Attlee's words quoted above pose the problem and may well provide the answer. When is the last resort? It is beyond doubt that ultimately the bomb would be used—no nation would admit defeat with this terrible weapon of retaliation lying unused in its armoury. Are we to wait to use it as a rat's dying bite? Are we to hold back and watch our enemy overrun Europe and set up his V-weapon sites again on the Channel coast, and do nothing to stop him except with weapons of his own choosing, against the massed tanks and guns and the hardy, expendable millions of militant Communism? We cannot rely on him solving our problem for us by using the bomb first ; it would suit him admirably to fight a war with the weapons in which he would have a decisive advantage—what General Gruenther has called a " war of flesh."

Surely the fact is that the existence of the nation, and indeed of the free world, *would* be at stake from the moment the men of the Kremlin decided to risk everything on the desperate gamble of total war? They will not do so if we continue to make it unmistakably clear that any major aggression will call down our massive retaliatory power upon their heads. Hitler might have launched the bomb in the final frenzy of his "Gotterdammerung"; he would not have done so in 1939 had he known the result would be instant retaliation in kind. There have been occasions in history on which tyrants have sought to distract their people's attention from internal dissensions by creating an external emergency. That stratagem may have had its advantages in the past ; it is hardly likely to prove attractive—even if it proved practicable—in an atomic age. The gangster does not shoot to kill if he knows the inevitable result is a policeman's bullet in his brain—except in the last resort when he also knows that the alternative is the electric chair.

For us there might be some reason, which no one can define with precision in advance, for allowing the situation to develop before striking the blow. A reason against doing so would be that it would rob us of the last-minute chance—and a real chance—of bringing the enemy to his senses and preventing war at the last moment ; a definite and unmistakable warning that we should answer aggression with the bomb might well have that effect. But we need never reach that point—shall never do so if we do not waver in our purpose. Here is a case surely where "Fear and be slain" is the only motto for free men. Russia could not survive the onslaught of Anglo-American air power with the atomic and the hydrogen bomb, and the hard-headed materialists in Moscow know it. We might not survive it either; but that would be cool comfort for the Kremlin. We certainly should not survive a "war of flesh" in which we were precluded for any reason from using the one arm in which we can compete at least on equal, and more than equal, terms with them.

It is true that Russia, with her subservient but unreliable satellites, might not be our only enemy in another World War. Russia and China would be an immensely formidable combination. China is at present less susceptible to atomic power than is the Soviet Union : and her long-suffering people are hardened by centuries of experience to catastrophic disaster by flood and famine. That situation will progressively change as China becomes more industrialized. In spite of her vast potential, moreover, China by the accidents of geography can never be a direct and mortal threat to the free world in the same way or to the same degree as Russia. She can be a grave menace to South-East Asia and the great Indian Peninsula, and we must be prepared to sustain and support the free Nations of Asia against minor military aggression, as we had to in Korea. But Chinese Communism has most to gain from the tactics of the termite ; and it is primarily in the political and economic field that we must combine to resist its advances. It is wishful thinking to see in Mao tse Tung an Asiatic Tito ; but neither is China indissolubly bound to the Soviet Union. There are many potential points of friction*, and the time may come when China is more Russia's problem than that of the free world. Whether and if so when that time will come will depend largely upon our own vision, statesmanship and readiness to adapt our traditional policies to the new realities of Asiatic nationalism. Meanwhile it is the Communist slave-drivers of Moscow who are our most deadly actual adversaries in the Cold War and potential enemies in a hot one. And until the patient peoples of the U.S.S.R. can free themselves from their yoke, our ultimate goal of universal peace and world Government depends for its attainment primarily upon our ability to contain and neutralize the menace of Soviet Communism.

For that purpose we must and can rely upon the Great Deterrent of Anglo-American atomic air power ; and the first charge upon our military resources should be the maintenance of our strategic bomber fleets at the highest pitch of efficiency and readiness. The Pax Atlantica must rest as surely upon this modern version of the Battle Fleet as did the Pax Britannica (and, incidentally, the validity of the Monroe Doctrine) upon the Royal Navy for 100 years after Napoleon. We in Great Britain must assume our necessarily smaller but none the less immensely valuable share in the Allied air striking force. One may note with amusement that those sections of political opinion in England who are most vocal about the dangers of American domination, are also those who are readiest to suggest that we should leave the whole burden and responsibility of atomic air power to the United States. It would no doubt have been more comfortable and less expensive for us in the West if we could have retained the monopoly of the terrible secrets of nuclear and thermo-nuclear power. But that we were never entitled to expect, and the possession of those secrets by our potential enemy does not invalidate the deterrent, though it raises many other problems for us. Nor does it mean that Allied air power must be in vastly superior strength. The size of any force depends on the job it may have to do in war ; and that of our air striking force must be determined by a professional military appreciation of what would be required if it became necessary to eliminate Russia's capacity to be any longer a menace to her neighbours. What is vital is that we should not fall behind—indeed it should be well within our capacity to retain the lead—not only in the training and aptitude of our crews (about which we need have no anxiety) but in the technical efficiency of our aircraft and equipment. The prime object of our scientific endeavour in the field of military research and development must be to ensure that we can continue to put down the bomb where we want to, if we have to, and without an unacceptable rate of loss. And nothing could be more important than to make quite certain that if the time comes, as well it may, when the manned bomber even at trans-sonic speeds is effectively neutralized by scientific means of defence, we have ready to take its place the unmanned bomber against which it is impossible to visualize any practical defence. Nothing could be more fraught with peril than an interlude in which the manned bomber had met its match and we had nothing to replace it.

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* See, for instance, "The Soviet Grip on Sinkiang," *Foreign Affairs*, April, 1954.

There are critics of this policy who have found in it the difficulty that Air Forces, armed at great cost with atomic bombers, may find themselves excluded even from relatively small local wars on the Korean model. That perhaps is not impossible—though the great bomber can use weapons other than the hydrogen bomb, just as the policeman can discard his pistol for the truncheon ; and they may be of great value in small wars, as their forerunners were in Korea. But in any event that criticism is not a reason for having no atomic bombers—indeed it is the reverse. Between Trafalgar and Jutland the British Battle Fleet was excluded from the "Korea-type" wars of that age, but it kept world peace for 100 years none the less. And for generations past we have spent millions on heavy coast artillery guns ; the fact that hardly any of them ever fired a shot in anger was no cause for criticism—indeed it was their justification.

Meanwhile, perhaps for a generation or more, the prospect before us is the "long haul"—which, with respect to Mr. Dulles,* was not altogether a new concept when the United States submitted it to the N.A.T.O. Council in April, 1953. Under that concept it will obviously be essential "to hold a careful balance between the demands of defence and other sectors of the economy"—in the words of Her Majesty's Government's "Statement on Defence, 1954." But we must guard against a tendency that has already revealed itself to imagine that what has been loosely described as the "New Look" in strategy holds out great possibilities of economy in defence expenditure. This so-called New Look is in fact merely a rationalization of tendencies, themselves originating in economic factors, which it had become increasingly obvious since the Lisbon meeting of N.A.T.O. at the beginning of 1952 would have to be faced sooner than later. It accepts the fact that a concept based on a modernized version of World War I, with vast armies permanently arrayed in Europe and with atomic air power superimposed upon it, is neither economically practicable nor strategically essential. To that extent it represents a saving, in that it gives us a deterrent to aggression and a real measure of security otherwise unattainable except at astronomic cost. But the existence of the shield and cover of air power will not give us peace on the cheap. N.A.T.O. remains as essential as ever, though all its members should adjust their minds to the inevitable reality that the essential covering forces on European soil must ultimately become the responsibility of the Europeans—including the Germans. Primary reliance on the power of the counter-offensive does not mean we can ignore the defensive, on land, at sea or in the air. And we dangerously delude ourselves if we imagine that we can safely afford in the long haul to accept substantial reductions in the present fighting strength of our "conventional" forces, particularly of the armies. Savings there must be and can be, particularly in those components of our armed strength which would only be required to sustain a long war—which surely is not a serious possibility in an atomic age. We should review the organization of our military establishments with an unsentimental and ruthlessly critical eye to eliminate non-essentials, and should reconsider the distribution of our defence resources between the different arms to make sure that it accords with the new realities. But our concern should be more with the quite attainable aim of getting more real fighting value out of our existing allocations of manpower and material, before we seek relief from the present burdens of defence expenditure. We are committed to a policy of peace through strength; and if we now cut our real fighting strength, then we shall not have peace—nor, in the long run, shall we have economy.

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* "Policy for Security and Peace," *Foreign Affairs*, April, 1954.

We are, alas, all too unlikely during the long haul to enjoy real peace as we knew it before 1914. Experience at Berlin and Geneva should have convinced us, if proof was needed, that the Communist aim of world domination has undergone no change. If it be true that the Communists can no longer hope to achieve that aim by the direct assault upon the citadels of Western democracy, they will surely seek to do so by undermining our defences and picking off our isolated outposts. The existence of the Great Deterrent to total war means, in effect, not that minor aggressions are less likely than hitherto, but more likely. Our enemies will surely seek to overtax our strength by tactics in which they have the advantage of us, but to which it would clearly not be in our interest to retaliate by "turning every local war into another world war", in Mr. Dulles's words.* Only people like Hitler can allow their patience to become exhausted—and it didn't do him much good in the long run. We must in fact expect to be faced with other "Koreas" which it will be in our interest to localize and insulate as unquestionably it was in the real Korea. As the Secretary of State has said, "Massive atomic and thermo-nuclear retaliation is not the kind of power which could most usefully be evoked in all circumstances . . . the free world must have the means for responding effectively on a selective basis when it chooses."* No one can draw a blue print in advance to suit every possible hypothesis, and there is a good deal to be said for keeping our enemy guessing. But he must know as well as anybody that we cannot hope to deal with these minor aggressions on the cheap, by air power and sea power alone. These other Koreas, if they occur, will require the participation of land forces, perhaps on a substantial scale, with air cover and support as they had in Korea. It is no doubt an unpleasant thought that in these circumstances our enemy has the advantage of vast masses of expendable manpower, and no qualms about expending it. But in the areas where we may have to meet these local aggressions that is not a decisive advantage; he can be met and held by well-trained professional armies with the support that science can give them. Moreover, we must not assume that American and European armies will always have to bear the main brunt of aggression in Asia. That must be primarily an affair for the free Nations of Asia; and our endeavour should be to help them to arrive at a state of political and economic stability and military efficiency, in which they can take their due share in a free defensive partnership. Nevertheless, at least for some time to come, we must be prepared to deploy British and American forces to meet aggression against the frontiers of freedom in Asia. That is only one reason why such a large proportion of our best land and associated air forces should not be permanently contained on the European front where others could take their place and where, as long as the West has adequate strength and we retain our unity and steadfastness of purpose, aggression is least likely. We must regain freedom of action for our strategic reserves which should be centrally located, endowed with the highest degree of air mobility, and with subsidiary base facilities and training areas where they may be needed.

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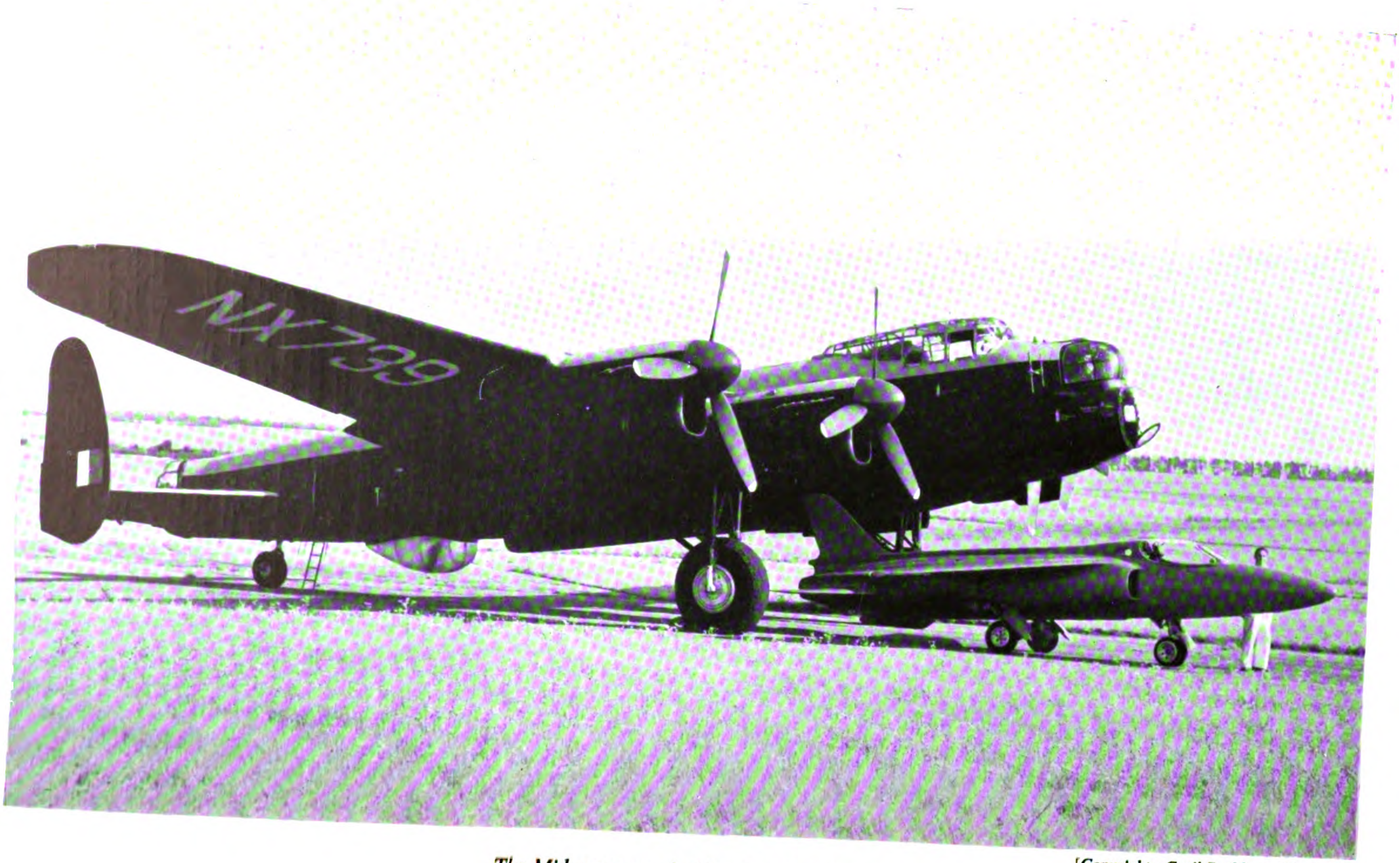
* *ibid.*

The hydrogen bomb will have no share in these localized wars, any more than a battle-cruiser squadron in a scuffle with Yangtse pirates in the nineteen hundreds. But this is not to say that the Bomber Force will have no part to play. The atomic weapon may well be used to do what thousands of H.E. bombs were formerly required to do; and the striking force need not necessarily again be restricted by another Yalu. Both will depend upon whether they are to our tactical and strategic advantage rather than to that of the enemy. It has been suggested that all air action at any distance behind an enemy's front line may be ruled out by fear of precipitating massive retaliatory action by the hydrogen bomb. That is perhaps not inconceivable; and, if it means that war of any sort may not be carried far into a neighbour's country may not be without its advantages; it would certainly make aggression unprofitable. Actually, however, the suggestion appears somewhat far-fetched. It might have some force on the European front, but there it is difficult to imagine anything between a relatively trivial frontier incident and the outbreak of total war. Elsewhere it seems hardly likely to be applicable. Let us imagine—purely for the sake of illustration—that we have to meet a local aggression against Northern Persia. Is it the idea that a bomber formation making for, say, a marshalling yard at Grozny or an airfield at Astrakhan would be assumed to be carrying a hydrogen bomb to Moscow, with the result that Soviet hydrogen bombs would instantly be dispatched to London and Washington? It surely requires somewhat of an effort of will to believe anything of the kind. It is worth considering whether in this connection a useful precedent might not be found in the system known as Air Control as practised by the R.A.F. against primitive tribal enemies between the wars; it was common practice to notify a clearly defined geographical area as a "prescribed area" within which any hostile activity was liable to air attack without further warning—it being understood that targets outside the prescribed area would not be attacked without further specific notice.

The idea that superior air power can in some way be a substitute for hard slogging and professional skill on the ground in this sort of war is beguiling but illusory. Air support can be of immense value to an army; it may sometimes be its salvation; it did not need Korea to prove that. But we must have a care not to misread the lessons of Korea, or of the closing years of World War II. The truth that we should take to heart is that armies can fight—and not only in defence—in the face of almost total air superiority. We should have learnt that from the Germans, in Italy, in France and on the soil of Germany itself from 1943 to the end; the Chinese proved it again in Korea, and the fact that the Viet Minh had no aircraft did not prevent the fall of Dien Bien Phu. We should take advantage of every aid that science and technology can give us, and they are great, especially in defence. Unlike at sea and in the air, modern scientific developments have favoured the defensive on land rather than the attack. But in these minor though gruelling wars nothing can be a substitute for tough, self-reliant infantry and, above all, for the highest degree of battle discipline under war-seasoned officers of high quality. Oddly enough, the truth is that these small wars call for even higher qualities of leadership than when whole populations are ranged against each other in arms. Unfortunately in such wars also a Western army is at a disadvantage as compared to the troops of a totalitarian State—particularly if they are Asiatics—owing to the relatively high standard of living which we have become accustomed to regard as indispensable in war. Our enemies can live and fight on an extreme austerity basis, and are prepared to live largely on the country, regardless of the welfare of the inhabitants whom they will not hesitate to use as beasts of burden on their line of supply. They are therefore far less dependent than we upon all the paraphernalia of logistic support, on dumps and depots, rest camps and hospitals and great truck convoys on the roads leading to the front—and are consequently less vulnerable than we to air action against their lines of communications and back areas. It was fortunate in Korea that we did not have to maintain our forces in the field in the face of enemy air interdiction. We could do it, and we may have to do it; and our training and organization must be such that if necessary we can fight as stubbornly with our supply lines constantly subject to attack as did our enemies in Korea.

All this is cold comfort for him who hopes that air power will provide some cheap short cut to victory. We are in World War III now, and war is an expensive business. We cannot carry our reliance upon the counter-offensive to the possibly logical but actually ludicrous extreme of ignoring the defensive at home or at sea. The first requirement for a successful offensive is a secure base, and we cannot leave ourselves wide open. At the same time we should only cripple ourselves if we aimed at anything like complete over-all protection. If we try to be strong everywhere we shall be strong enough nowhere. A reasonable measure of protection (including civil defence) against air attack at home, and a sensible insurance against the mine, the submarine and the raider at sea, are all part of the deterrent and must be provided. The crux is to strike the happy mean between too little and too much. And the one certainty is that it will be expensive—but not so expensive as defeat in the war of the long haul.

We must face the future with acceptance and resolution, and with steady nerves. There is no need for despondency. Our combined organization and equipment for security are incomparably superior to anything we have known before—if there had been anything like it twenty years ago there would have been no World War II. The one essential, lacking which we are all of us ultimately doomed, is to preserve the unity of the free world and, above all, of the United States and British Commonwealth; that is as vital, in the long run, to the United States as to her partners.



The Midge compared with a Lancaster bomber.

[Copyright: Cyril Peckham, Weybridge

THE CASE FOR THE LIGHT FIGHTER

BY JOHN W. R. TAYLOR

EVER since the Folland Aircraft Company announced three years ago that they had designed a lightweight fighter plane, which they intended to build as a private venture, there has been violent controversy between those who favour simplicity and those who believe that warplanes must inevitably be big and complex in this atomic age.

Until August, 1954, it seemed that the latter were winning the battle of words: especially when the Air Ministry made it clear that the Royal Air Force had no foreseeable requirement for lightweight fighters. Then, on 11th August, the prototype Folland Midge made its first flight. Within a month it had become one of the stars of the 1954 S.B.A.C. Flying Display at Farnborough, and many of the critics began to wonder if they were wrong after all.

Certainly the Midge is tremendously impressive.

Its sleek lines give it the appearance of a baby Hunter; yet it is little more than half the size of a Hunter or Swift and probably only one-fifth as heavy. It is, in fact, one of the smallest fighters ever built, with a wing span less than that of the Sopwith Pup of the 1914-18 war; and, at Farnborough, this undoubtedly helped to make it look even faster than its 600 m.p.h. top speed.

It had obvious limitations. In particular, it could not continue to climb steeply up and up, through and beyond the clouds, as could the bigger fighters. This was hardly surprising, because the Midge has only one-sixth the power of a Hunter or Swift and was built solely to test in flight the efficiency of the airframe of the much more powerful Folland Gnat.

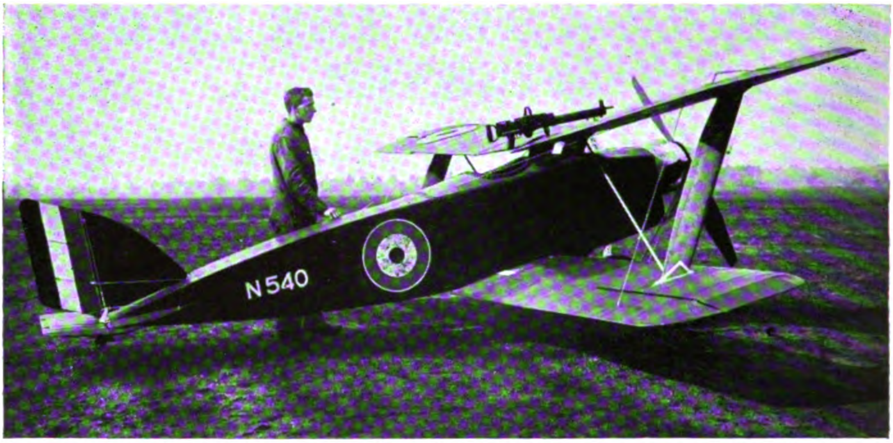
But let us go back nearly forty years to the beginning of the story.

It is no new thing for aircraft designers, pilots and taxpayers to be appalled by the steadily increasing size, weight and cost of fighter aircraft. The little Sopwith Pup of 1916 had a wing span of 26 ft. 6 in., weight of 1,225 lb. and cost about £1,390. Its 1918 successor, the Snipe, spanned 30 ft. 1 in. and weighed 2,020 lb., justifying the increase by flying into action with twice the Pup's armament, a 15 m.p.h. gain in speed and 33 per cent improvement in rate-of-climb.

By the start of World War II, the shape of the fighter had changed completely. It had become a monoplane with a retractable undercarriage. Its weight—taking as an example the Hurricane Mk. 1—had increased to over 6,600 lb. and its wing span to 40 ft. Operationally, the differences were even more striking. Its speed was 330 m.p.h.; it could climb to 20,000 ft. in less time than the Snipe took to reach 10,000 ft.; it carried radio and eight rapid-fire machine-guns. And it cost £5,000!

Under the impetus of war, size and weight increased still more rapidly. The Hurricane IIC weighed up to 8,710 lb.; the Typhoon, 11,500 lb., not counting the bombs and rockets that supplemented its guns. Self-sealing fuel tanks, additional radio equipment, gyro gun-sight, variable-pitch propeller, armour plate and heavier guns all improved fighting efficiency . . . and all added inexorably to weight, size, complexity and cost.

For a time, the advent of jet propulsion halted the trend. Cockpits became simpler and the lighter weight of the engines reduced all-up weight. Only



PV8 EASTCHURCH KITTEN, BUILT IN 1917, 35 h.p. A.B.C. GNAT
Intended to be small enough to take off from Destroyers and small craft. Wing span 19 ft., all-up weight 595 lbs., max. speed 94½ m.p.h.

the cost continued to rise, to a mass-production price of about £25,000 per aircraft.

It was not long before all the graphs began to rise again. The second generation of jet-engines were much more powerful, but heavier. They required more controls and instruments. New operational equipment was devised: new and bigger guns perfected. To satisfy a never-ending demand for higher speed, rate of climb and service ceiling, after-burners and pressure-cabins were added. Ejector seats and dive-brakes became necessary; followed by power controls to ease the pilot's burden.

At the new speed of air combat, an enemy could not be held in the gunsight for long periods: so accuracy of aim had to be improved. Radar gunsights, radar ranging and other equipment supplied the answer at a weight penalty of 200 lb. and a 4 per cent increase in the cost of the aircraft.

By 1948 the American F-86 Sabre weighed 14,000 lb. and cost well over £100,000. Six more years and the F-100 Super Sabre almost doubled the weight at 27,000 lb. and carried a price tag that would have bought four squadrons of Battle of Britain Hurricanes and Spitfires, or 180 Pups. But it could travel faster than sound in level flight, fight at over 50,000 ft. and offer an unprecedented degree of combat efficiency—always provided, of course, that the Treasury could afford to buy it, sufficient highly-trained pilots could be found to fly it, and sufficient equally skilled ground crews could be produced to keep it serviceable!

Looking at the super-efficient, super-complex, 13-ton single-seat fighters of today, it is strange to think that anyone should have considered the wood-and-fabric Camel and Snipe of 1916-18 too big and complex. Yet in those years at least two or three designers built lightweight fighters to try and halt rising size and cost. Typical were the little Kittens, built at the Naval Experimental Depots at the Isle of Grain and Eastchurch. Powered by 35 h.p. A.B.C. Gnat engines, they were very small and extremely manœuvrable, but would have stood little chance against the bigger, more powerful and more heavily armed conventional fighters of their time.

Ten years later, the Blackburn Company produced a light fighter named the Lincock which could fly at 160 m.p.h. with a Lynx engine of 250 h.p.—only

20 h.p. more than a Snipe and 175 h.p. less than the R.A.F.'s standard Siskin fighter, which had a top speed of 155 m.p.h. But the Lincock found no favour, and achieved only minor fame in the 1930's, when a developed version was used by Geoffrey Tyson for aerobatic displays with Sir Alan Cobham's air circus.

It was not until the Japanese Navy confronted the Allies with the Zero in 1942 that light fighters began to be taken seriously. Weighing only 5.750 lb., it was extremely manœuvrable, fast and heavily armed, completely outclassing most British and American fighters then in the Far East. Main drawback was that it would not absorb punishment and tended to break up under fire; but it inspired a successful weight-saving campaign on the American Mustang fighter, and a series of promising Hawker light fighter projects that came to nothing.

There was a repetition of the Zero story when early types of American jet-fighter, and British and American piston-engined fighters, suddenly came up against the Russian-built MiG-15 in Korea. Lighter, faster, higher-powered and more heavily armed than U.S.A.F. Thunderjets, it quickly acquired the reputation of a giant-killer, and there was renewed interest in weight-saving. Then the Americans brought Sabres into action, and by the end of the Korean war their pilots claimed the destruction of 800 MiGs for the loss in combat of 57 Sabres.

Better pilot training undoubtedly played a big part in this 14-to-1 victory; but the Sabres proved more able to survive damage; their radar gun-sights ensured more accurate aim; they were able to fly in the "sound barrier" compressibility shock wave region better than the MiG, so that the latter's greater engine power and lower weight could save it only in a climb. In short, the Sabre's rugged, heavier structure and profusion of complex "gadgetry" earned it the victory.

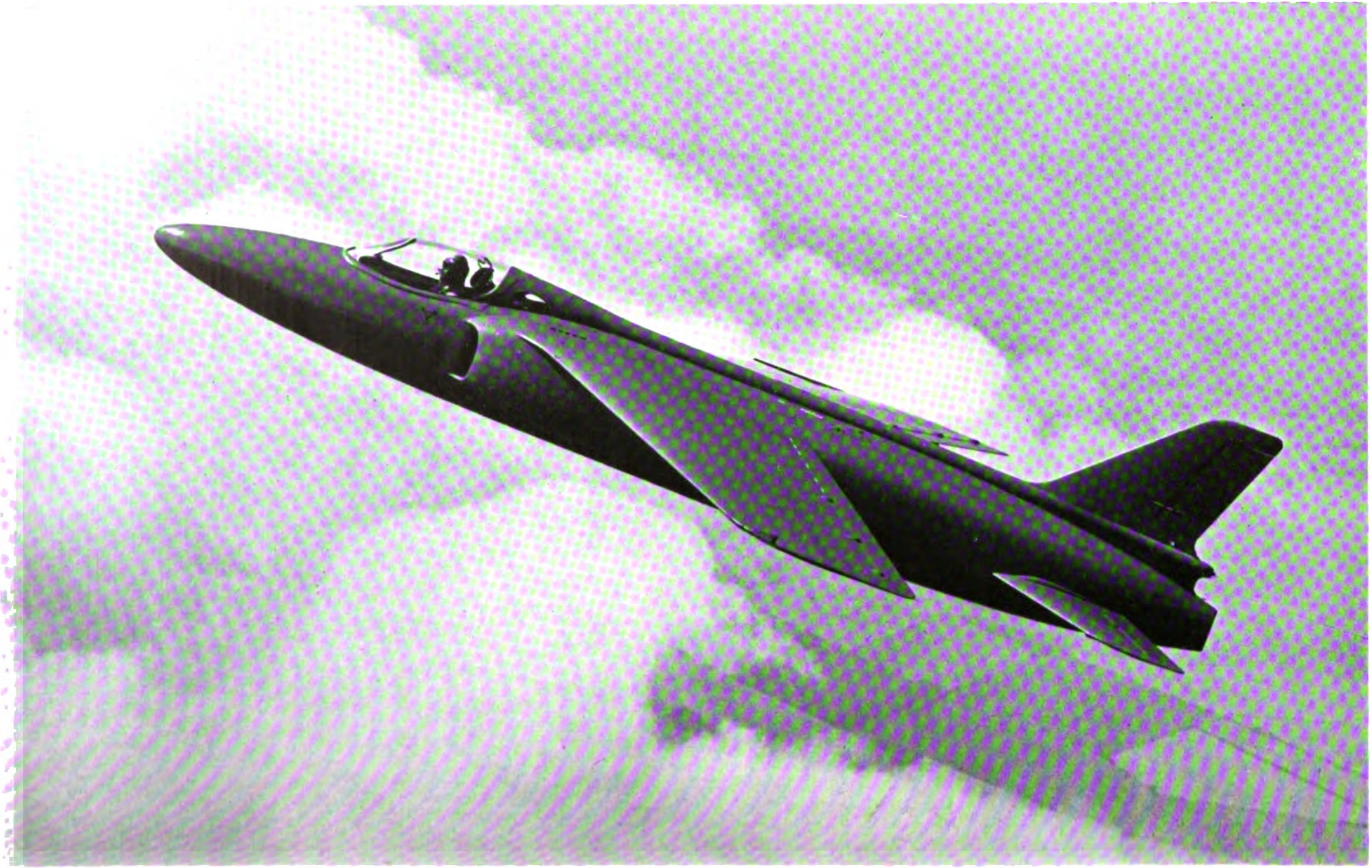
It was against this background that Folland Aircraft took the courageous decision in 1952 to sink a large amount of their own capital into designing and building a lightweight fighter, which they called the Gnat.

They had good reason for confidence in their chief designer—Mr. W. E. W. Petter—because, before joining them, he had been responsible for the Canberra bomber.

From the start, Folland made it plain that they had no intention of achieving light weight and simplicity at the expense of performance, safety or combat efficiency. It was a waste of time trying to pare down a conventional sort of airframe. The alarming weight increase since 1939 had resulted primarily from the introduction of a maze of new equipment, and the key to success was to save weight in this direction.

Every pound that could be saved would produce a corresponding reduction in the weight of airframe structure and, hence, in the engine power and the weight of fuel required for a specified range. The result of all this might be a total saving of anything up to ten pounds in the aircraft's all-up-weight for each pound of equipment discarded.

As a start, the Folland design team dispensed altogether with equipment which is necessary only because an aeroplane is big and heavy. At the same time, they found it comparatively easy to reduce the size and weight of many of the essential items. Knowing, for example, that the Swedish Saab Company had produced an efficient ejector seat for the tiny Saab-210 Draken research aircraft, Folland decided to use this seat, suitably modified, in the Gnat. It is only half as heavy as a standard R.A.F. pattern ejector seat.



[Copyright: Cyril Peckham, Weybridge

The Midge in Flight.

Showing great ingenuity, they designed the undercarriage and wheel doors so that they could be partially lowered at high speed to act as speed brakes, without affecting the aircraft's trim. This not only eliminated the usual kind of speed brakes, but also removed the need for landing flaps plus, in each case, the necessary operating gear.

Armament presented more of a problem, because the Gnat obviously had to pack a punch powerful enough to destroy any fighter or bomber it was likely to be matched against in combat Every available form of armament was examined, and the choice finally fell on two of the new 30-mm. rapid-fire cannon, which offer tremendous destructive power in a comparatively small package.

Having sorted out the equipment, Folland were able to start detail design of the airframe, which is an extremely simple stressed-skin structure, calling for little in the way of special machinery. By housing all the fuel, guns and the undercarriage in the fuselage, it became possible to build the wing as a sturdy one-piece structure, attached to the fuselage at only four main points and avoiding the complication of root fittings. In this way the number of component parts in the Gnat was reduced by 80 per cent compared with conventional fighters.

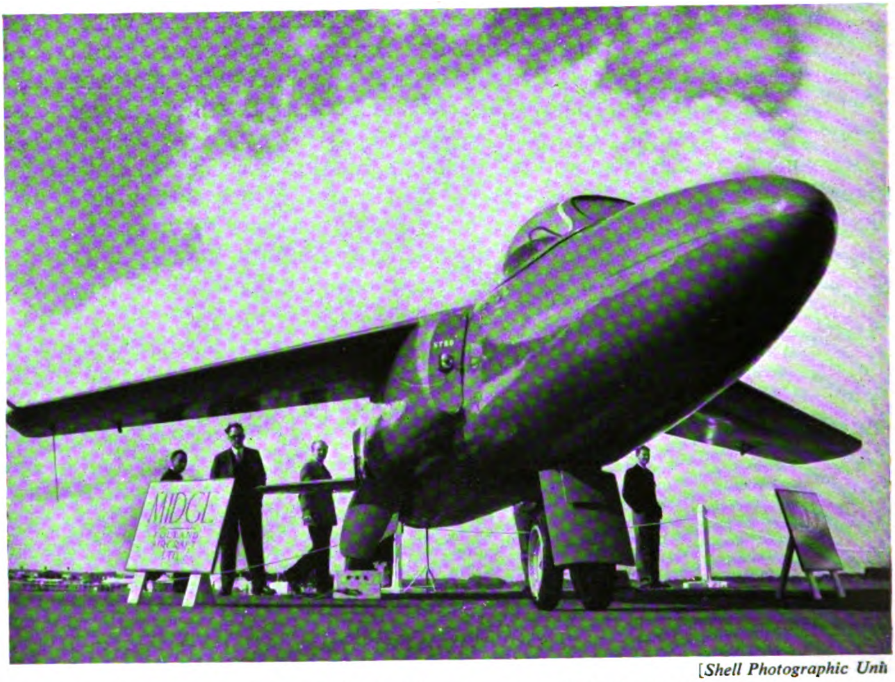
All these weight savings would have been a waste of time if there had not been available to power it an engine with a better thrust/weight ratio than anything so far known. Fortunately the Bristol Engine Division were developing just such an engine, which they called the Saturn. Blended with the Folland airframe it promised a fighter with the performance of a Hunter or Swift, but weighing no more than an early mark of Spitfire.

A few months later, the Folland design team was dismayed to learn that the Saturn had been dropped, with the pilotless bomber for which it had been designed. It looked like the end, because no other engine in the world offered the right combination of the low weight and high power. But Folland were so convinced of the potential importance of their project that they decided to complete the prototype using an Armstrong Siddeley Viper engine of 1,640 thrust—only one-third of the power for which the Gnat had been designed. They renamed this lower-powered prototype the Midge, and it was this aircraft that was seen at Farnborough last September.

Even Folland were probably surprised when it proved capable of over 600 m.p.h. in level flight. Furthermore, they no longer had to lament what might have been, because in the meantime Bristols had begun developing another engine—the Orpheus—which looked even better than the defunct Saturn. Although small enough to pack inside the Gnat/Midge airframe, it is designed to give 4,850 lb. of thrust, with normal life and overhaul period. So Folland were able to resume work on the high-powered Gnat, and a prototype is scheduled to fly this year.

It will be structurally similar to the Midge, except for the use of power-operated inboard ailerons, which will give an exceptionally high rate-of-roll—at least 200 degrees a second over a wide range of speed and altitude. The Midge's manually-operated rudder and low-set, power-operated "flying" tailplane will be retained. And the Gnat will almost certainly join the select few fighters able to fly faster than sound in level flight. Nor will it suffer, like the Midge, from an early drop-off in rate-of-climb, because it will probably have the best power/weight ratio of any fighter in the air.

This, then, is the aircraft that will soon be available to N.A.T.O. air forces. Folland makes the following claims for it:



[Shell Photographic Uni

The Folland Midge research aircraft fitted with an Armstrong Siddeley Viper A.B.V.S. Jet Engine. It is a prototype for the new Gnat lightweight high-speed fighter.

Midge en route to Boscombe for first flight, 11*th August*, 1954.

- Tooling time for production is halved, and five Gnats can be built in the same number of airframe man-hours as one standard fighter.
- Twenty Gnats, complete with engines and all essential flying, navigational and armament equipment, can be built for the price of six standard fighters.
- The five Gnats produced in the same time as one standard fighter can bring to bear ten 30-mm. cannon compared with the four 30-mm. cannon of the standard fighter. Accuracy of aim is ensured by Distance Measuring Equipment, fitted as standard, and there is provision for radar-ranging.
- Because of its high thrust/weight ratio, powered controls and low lateral inertia, the Gnat has outstanding manœuvrability. Pilots can learn to fly it in less time because of its simplicity and fine handling qualities.
- The simplicity of its systems and the smaller amount of equipment cut maintenance time and ensure a high degree of serviceability. No trestles or staging are required for routine servicing.
- The Gnat can be carried by air freighter, ship or road vehicle with little or no dismantling, and can be given ample duration for ferrying by the use of long-range tanks.

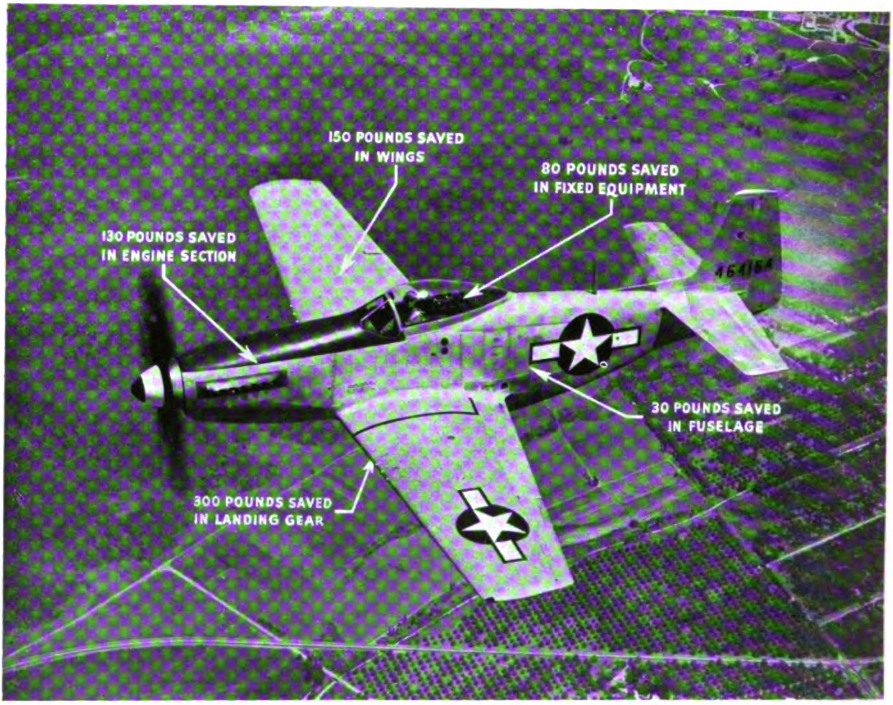
Some of these claims have already been borne out by the Midge, which made its first flight from Boscombe Down just thirteen hours after leaving Folland's factory at Hamble, near Southampton, on a standard "low loader" lorry. Its pilot, Squadron Leader E. A. Tennant, D.F.C., made only one taxiing test before the maiden flight and, on the second test flight, a few minutes later, performed a series of fast and slow rolls.

There is little reason to dispute any of the advantages claimed for the Gnat; yet the Air Ministry still shows no interest in the project. This has, inevitably, led to hints from some sections of the Press of lack of imagination in official quarters. But the only way of justifying such criticism is to prove that there is a place for a light fighter in our current defence planning; and this is not so easy as merely being critical!

Against the advantages listed above must be set the fact that large numbers of Gnats would need large numbers of pilots. At a time when young men are not coming forward in sufficient numbers to meet current aircrew requirements, this is undoubtedly a major snag. On the other hand, experience has shown that there would be little shortage of volunteers in an emergency, and Gnat pilots could be trained far more quickly and cheaply than pilots for conventional fighters. And, of course, the fact that the aircraft itself is so easy to build would be even more of an asset in wartime. Nor is there any reason why Gnats should not be supplied now to Auxiliary squadrons and Reserve units, to form a fully efficient, formidable line of defence behind the regular squadrons.

The Gnat is intended to fill two roles—interception and ground attack. Taking interception first, the main current requirement is to be able to intercept very fast, high-flying jet-bombers in all weathers, by day or night. This calls for two distinct types of aircraft: a supersonic, fast-climbing, single-seat day fighter and a powerful two-seat all-weather night fighter, able to track down and kill an enemy that its pilot sees only as a "blip" on his radar screen.

The Gnat comes into the day fighter category, for which the Hunter and Swift are at present entering service. But even if we admit that it will do anything that they will do, there is the unanswerable argument that we have Hunters now, whereas the Gnat could not possibly be in service this year,


150 POUNDS SAVED IN WINGS
80 POUNDS SAVED IN FIXED EQUIPMENT
130 POUNDS SAVED IN ENGINE SECTION
30 POUNDS SAVED IN FUSELAGE
300 POUNDS SAVED IN LANDING GEAR
464164

[*Photo: Courtesy North American Aviation Inc.*

Where the weight was saved on the North American P51H Mustang fighter late in World War II.

even if its engine was in production, which it is not. By the time it is ready for service. something better ought to be available. Both America and France are developing ultra-fast lightweight fighters with combined jet and rocket power, and it is inconceivable that we should have neglected this type of aircraft, which offers the perfect combination of high rate-of-climb and supersonic combat performance at extreme altitude on its rocket-motors, and economical cruising on jet-power alone.

So the Gnat seems to be just too late for Fighter Command, and this may explain the Air Ministry's attitude. But we must remember that not all N.A.T.O. countries have the resources to build, pay for or even operate high-performance rocket-fighters or all-weather interceptors filled with complex radar equipment. For them the Gnat might well be ideal, and it is unlikely that the West will ever have so many fighters that a few more squadrons would not be welcome. Nor should we overlook the fact that an enemy might fly low, not high. It would be much more healthy hedge-hopping after an enemy bomber in a manœuvrable, compact, simple little machine like the Gnat than in a heavier, less responsive aircraft.

Mention of hedge-hopping brings us to the second role—ground-attack in support of land forces. Here there is an excellent case for the Gnat, which can carry two 500 lb. H.E. or napalm bombs or twelve 3-in. rockets, in addition to its fixed armament. At one period cheap, easy-to-build and easy-to-fly light planes like the American Fletcher Defender seemed to offer many advantages for this work; but now that even the Chinese have efficient radar-tracking anti-aircraft guns, these "battling bantams" would stand little chance of survival.

The Gnat, on the other hand, is fast enough to make surprise attack possible, small enough to be a difficult target, manœuvrable enough to get itself quickly out of the target area, and equipped with heavy enough armament to do a great deal of damage. Furthermore, it can operate from quite small forward airstrips and be flown by older or less highly-trained pilots than the first-line interceptors.

Up to now, air forces have tended to relegate their obsolescent fighters to ground attack duties, when something better became available for first-line interception. The low initial and operating costs of the Gnat would make it little more costly than using up old interceptors for the job.

Its designers did not sit down and produce just another fighter. They started from scratch on a completely new design concept, and, when studying its ability, N.A.T.O. air force chiefs must also look on it as something completely new. They should bear in mind that it is not just another fighter, but a means of reducing the great volume of expensive, vulnerable servicing equipment and fuel storage essential to maintain a combat air force in the field, and of avoiding the need for training super-skilled pilots for secondary duties. When these factors are taken into account it becomes apparent that the Gnat not only looks good but *is* good.

GNAT SPECIFICATION

Span: 20 ft. 8 in.
Length: 28 ft. 9 in.
Height: 8 ft. 9 in.
Sweepback: 40 degrees.
Undercarriage track: 5 ft. 1 in.
Maximum fuselage depth: 3 ft. 4 in.

Engine: 4,850 lb. thrust Bristol Orpheus axial-flow turbojet.
Armament: 2 x 30 mm. guns, plus 2 x 500 lb. bombs or 12 x 3-in. rockets.
Equipment: Pressure cabin, lightweight ejector seat, V.H.F. radio and Standby, Distance Measuring Equipment, provision for radar ranging, air brakes, braking parachute, landing gear suitable for temporary airstrips. Provision for wingtip fuel tanks.

Speed: Supersonic in level flight.
Duration: Over one hour at high altitude on internal tanks.
Ceiling: Over 50,000 ft.

REQUEST FOR 1940 AND 1948 COPIES OF "THE ROYAL AIR FORCE QUARTERLY"

A request has been received from America for the undermentioned numbers of "The Royal Air Force Quarterly":

No. 9—September, 1940.

No. 19—January, 1948.

Unfortunately these are not available at the publishers.

It would be greatly appreciated if anyone willing to part with these early numbers would send them to: Squadron Leader W. A. M. Dunjey, A.F.C., Air Ministry (S.T.7), London, S.W.1.

WAR—LIMITED or UNLIMITED?

BY AIR MARSHAL SIR ROBERT SAUNDBY, K.B.E., C.B., M.C., D.F.C., A.F.C.

IT seems probable that the twentieth century will be known to historians as the century of the World Wars.

If we study the history of war, we shall find that for many centuries wars were fought for limited objects, and the military operations were correspondingly limited in scope and violence. Wars were largely dynastic—waged to turn out a usurper or make good the claims of a pretender—and in such campaigns it was obviously to the advantage of both sides to cause the minimum of material destruction. The ordinary people were not particularly interested, and, as far as possible, tried to carry on with their normal occupations and keep out of trouble.

Civil wars were an exception, and were notoriously bloody and bitter, setting family against family and even brother against brother. Religious wars, also, owing to the fanatical element liable to be involved, were sometimes fought with a passion and cruelty that was unusual. But, even so, material destruction was not widespread, but usually directed to some limited purpose, such as the destruction of the baronial castles by Cromwell.

I am not saying that medieval wars had not aspects of cruelty—the inhabitants of captured towns, especially if the defence had been long and stubborn, were sometimes treated with savage brutality. But, by and large, the armies were composed of mercenary troops, who fought dispassionately, or of peasants owing a military duty to their lord, whose main object was to get the war over and return home. The worst fault of such armies was their habit of pillaging and looting, and this was largely a consequence of their irregular system of payment.

The mercenaries, being professional soldiers, undertaking fighting as a business did not intend to get themselves killed unnecessarily. Although well aware that they had chosen a risky profession, they did not expect their generals to fight pitched battles in unfavourable circumstances, or call upon them to die in the last ditch in the defence of some fortress or other. On the contrary, armies went into winter quarters to avoid the miseries of campaigning in wet, cold and mud. Certain courtesies were observed, and wars tended to become exercises in professional skill by the opposing generals. They were affairs of strategy and manœuvre, marches, counter-marches and sieges; all strictly governed by the "disciplines of the wars," as Fluellen called them.

In the eighteenth century the discovery and development of new lands and the growth of overseas trade led to a series of colonial wars. But such wars were fought for strictly limited objects, and the forces involved were seldom large.

This pattern of campaigning persisted until the Napoleonic wars. Napoleon, after his initial successes, did not play fair. His ambitions were so vast that he refused to be bound by the rules of the game. His great armies, raised by a *levée en masse,* were inspired by patriotic feelings and by a fervid devotion to their gifted leader. But even in the Napoleonic wars no deep-seated national hatreds were engendered, and some sense of proportion was observed.

But Napoleon's long series of campaigns had affected the lives of ordinary people to an unusual extent, and it is significant that his final defeat at Waterloo was followed by a period of 100 years which was less marred by warfare than any before or since. Only a few minor wars occurred in Europe —the Franco-German War of 1870 was the most important—and, apart from the Crimea and the Indian Mutiny, this country enjoyed peace except for Colonial troubles in North and South Africa, culminating in the Boer War.

In 1914 the First World War ended the peaceful century. It was waged with exceptional bitterness and ferocity on a widespread scale, and directly and indirectly caused the loss, in little more than four years, of more than ten million lives. This was quite unprecedented, and such wholesale slaughter engendered hatred and bitterness between peoples on a scale never before known. The Second World War arose directly out of the problems which the First World War had left unsolved, and had its mainspring in the injustices, resentments and inflamed feelings which were the legacy of the years 1914-18.

In the Second World War, all previous records were transcended. Atrocities were committed on a scale never before imagined, and national hatreds were further inflamed by reckless propaganda. The civilian populations, now brought fully within the devastating orbit of war by air bombardment, suffered severely. The war raised many more problems than it solved, worsened international relations, lowered moral standards, and sowed abundant seeds from which a third world war could only too easily arise.

If that should happen, the powerful weapons of mass destruction, now at the disposal of both sides, would cause unimaginable loss of life and material ruin. The work of man's hands for the last thousand years would largely disappear, and it is probable that civilization itself, as we know it, could not survive what Mr. Adlai Stevenson has called a "thermo-nuclear holocaust."

But even if, as seems probable, the appalling power of modern weapons and the very completeness of the destruction certain to overtake all the belligerents will make resort to a third world war unlikely, we are living in a world of tension, divided into two ideological groups quite irreconcilably opposed.

Towards the end of the nineteenth century most Europeans were firmly convinced that civilization was making great progress, and that they could look forward to peace and increasing prosperity. Man's inhumanity to man seemed to be fading into the past and, in this country at least, man's cruelty to animals more troubled the public conscience.

What has gone wrong with the twentieth century? Why has the Western World, in spite of its great efforts to stand up for liberty, justice and truth, and its desperate yearning for peace and higher standards of living, brought itself to the very brink of universal disaster?

I think that one very important reason is that we have lost sight of our object in war, and have allowed the means to obscure the end.

In the past, wars fought for a limited object—keeping that object firmly in view—have often been successful. Wars having an unlimited object have seldom if ever succeeded, in the sense of creating a world situation more favourable than if there had not been a war, and they have always caused widespread destruction and loss of life.

Let me give an example. Russia has been involved in four wars during the last 150 years. In the first one, Napoleon attacked Russia in 1812. The immediate cause of the war was Russia's refusal to support any longer the "Continental system" aimed at the economic isolation of Britain, but Napoleon's real object was, or became, an unlimited one. He wished to destroy the Russian power and, as far as possible, extended his sovereignty over the vast territories of Russia in Europe. Every schoolboy knows the story of his failure and how, during the terrible retreat from burning Moscow in the depths of a Russian winter, the Grande Armée withered away and only a miserable remnant survived. Napoleon's power was broken by this disaster and, though he struggled on through numerous vicissitudes until his defeat at Waterloo in 1815, it was his attempt to conquer and subjugate Russia that brought about his ruin.

The next war in which Russia became involved was the Crimea, in 1854. Russia had long coveted the great warm-water port of Constantinople. Observing the crumbling power of the Ottoman Empire, the Tsar thought he saw an opportunity of securing this prize. But Britain, France and Italy came to the aid of Turkey, with the limited aim of repelling the Russian aggression and restoring the *status quo*. They succeeded in this aim, in spite of an almost complete lack of generalship, and the grossest mismanagement of the Allied resources.

In 1904 Japan determined to stop the advance of Russia in the Far East. The Russian armies had overrun the great Chinese province of Manchuria, fortified Port Arthur, and were threatening Korea. The aim of the Japanese was the limited one of forcing the Russians to withdraw from these territories. The result caused great astonishment. The Japanese were rapidly victorious on land and sea, the fortress of Port Arthur was stormed and taken, and the Russians were thrown back behind their own frontiers.

Finally, in 1941 Hitler turned against Russia. The Russians had signed a non-aggression pact with Germany in August, 1939, and had joined with Hitler in partitioning Poland. They had done their best to side with Germany, and believed that they had backed the winning horse. But Hitler, faced with the necessity of dealing with Britain, feared that if he became locked in a life-and-death struggle in the West, the Russians—in spite of the pact—would seize the opportunity of attacking him from the East. So he decided to stand on the defensive in the West, and deal with Russia first.

His object was the unlimited one of the complete destruction of the Russian military power, and the annexation of a large part of Russian territory, including the Ukraine and the Caucasus. In this ambitious attempt Hitler failed disastrously. This, combined with the strategic air bombardment of Germany from the West, laid Europe open to the Allied invasion and lost him the war.

Of the four wars in which Russia has been engaged since the beginning of the nineteenth century, two had limited objects and were successful, while two had unlimited objects and ended in catastrophic failure, accompanied by terrible destruction and loss of life.

Of course, there are other factors involved, but it seems to stand out clearly that, if and when we get embroiled in hostilities with the Communist third of the world, we should take great care to select and adhere strictly to a limited object. Such an object was suggested by Marshal of the R.A.F. Sir John Slessor in his book *Strategy for the West*, published last June. He proposed that our object should be "to drive militant Communism back behind his own frontiers and keep it there." That seems to me very wise advice. For if we should be betrayed into a war against Russia in which our objects were the unlimited one of destroying Russian power—possibly, as we did in the last war, demanding unconditional surrender—then, even if we gained the eventual victory, we should fail. For such a victory would be worthless if in the course of the struggle we brought about the destruction of almost everything upon which our Western standards of living are based.

If we cannot abolish war, then at least we must bring it back under control. For we have at last, after several false alarms, reached the point where unlimited war will mean general suicide and the beginning of a new Dark Age.

THE PRINCIPLES BEFORE WAR

By Group Captain J. N. Tomes, C.B.E.

WE hear a great deal about the Principles of War and, despite the strict meaning of the phrase, we find them widely taught and accepted as everyday military guides. It is suggested that we should ask ourselves whether these principles do in fact also apply before war, and, if so, whether they carry the same meaning.

SELECTION AND MAINTENANCE OF THE AIM

Whatever the circumstances, Selection and Maintenance of the Aim has always been, and must always be, the first principle. Everything depends upon the Aim and, until we have clearly settled what it is and how, broadly, we are going to achieve it, we shall be in no position to interpret or apply the other principles.

What, then, is our Aim? It is—To prevent war if we can, to win should we fail. While the second part of this Aim must always be in mind it is not of immediate importance, because we are here concerned with the present and because the measures needed to achieve prevention now are substantially the same as those needed for winning in the future.

Prevention does not mean giving in to a possible enemy. It means frightening him away from either starting war, or from doing something which might force us into starting war. We can set about this in one of two ways. We can either build up such an efficient close defence organization that an enemy would assess his chances of winning to be too small or too costly ; or we can build up a real offensive capability and achieve our Aim by inculcating in the enemy an overriding fear of the consequences at home of aggression. (There is a third possible course, namely a combination of the other two. This, though militarily ideal, must be discarded because on economic grounds we could never build up enough strength in both spheres.) Since we can never with certainty read the mind of an enemy, we must always keep in view the possibility of failure and the fact that this would automatically throw us on to the second part of our Aim (to win). No close defence, however gallant and efficient, can ever win a war and we are thus left with in effect no choice. We have to arm ourselves in a manner which will enable us both to deter and to win.

OFFENSIVE ACTION

The foregoing has already led us well into our next principle, Offensive Action. We are told often enough that Offensive Action is the necessary forerunner of victory, but we pay far too little attention to the more urgent parallel axiom that the ability to be able to take effective Offensive Action is, as things are today, the *sine qua non* of peace. The operative word is "effective" and this simply means that the deterrent force must be big enough and good enough to do the job: the stakes are too vital to allow of half measures or bluff.

If we set our minds and our endeavours unswervingly on our Aim, and if we remain true to the principle of Concentration of Force, we need no longer too seriously heed the often heard dictum that, in the early stages of a war, the Royal Air Force is almost certain to find itself upon the strategic defensive.

CONCENTRATION OF FORCE

Concentration of Force has been officially suggested as the cardinal principle of war. As such it receives much lip service, but seems in practice to be the most ignored of all the principles. Concentration of Force can be paraphrased as First Things First, and, applied with prevention as the Aim and deterrent force as the method, this in turn simply means that we should have enough bombers at the outset.

If the principle were honestly followed, we should work out what we require as offensive deterrent. and when, and only when, this need has been met in full would we even start to pay heed to other claims. But, although we accept First Things First as a cardinal principle, we nonetheless succumb easily enough to temptation because other things are attractive, because they have sentimental or conventional pull, or, more often, because they are cheap. The reasons for spreading the limited national butter thinly over a large slice of bread are many and luring, and we are, the writer suggests, encouraged into such temptation by our insufficiently questioning acceptance of three further principles—those of Economy of Effort, Flexibility and Co-operation. All these can be admirable if properly controlled and if given modern, before-war interpretation, but under other circumstances they can be disastrous.

ECONOMY OF EFFORT

This is a worthy but a dangerous principle. Too often it is the great "let out," the excuser of weakness of purpose, the inadequately guarded door through which slip in all the less important claimants on our resources. Economy of effort easily comes to mean dispersion of effort.

The real meaning of this principle is, surely, that no single military activity should receive more resources than it needs for its task. But let us not forget that the converse also applies—that is, is not worth providing resources at all unless one can provide enough. Economy of Effort does not necessarily mean that our forces should be balanced, but rather that resources should be so allocated as to ensure: (i) Full, but not over full, provision for the offensive deterrent, and, after this has been achieved, (ii) provision for other claimants in order of priority and as far down the priority list as we can afford. The principle must not be allowed to imply partial provision for everybody.

We may in fact say that Economy of Effort is a fine theoretical principle, but one which we would be wise to approach with a measure of suspicion. If, however, we interpret it and treat it in the way just discussed, we shall have blocked one door to tempting claimants. But there will still be two doors left, and the first to which they will flock is Flexibility.

FLEXIBILITY

These lower priority claimants, having failed to get direct control of resources fall back on "Let us, then, be flexible. Let us build it (or organize it) so that it will do two or more jobs." It is difficult to counter this argument, and indeed it represents a point of view which is perfectly tenable provided always that it does not deflect us from our Aim. Flexibility of this kind may be accepted, but only after the full needs of the deterrent have been met and only subject to strict safeguards. These safeguards should guarantee that we do not sacrifice, either in fact at the present or in principle as part of future plans, any fraction of our offensive capability. Like Economy of Effort, Flexibility is a good theoretical principle, but one which we should apply with caution.

CO-OPERATION

The last door is Co-operation, and this is perhaps the most dangerous principle of all because the appeal is to sentiment and fair play rather than to the discipline of reason. Nobody likes to be called unco-operative, yet it can often be an admirable trait, indicative of firmness of purpose and of an unswerving adherence to the Aim. Co-operation is obviously important on the International level, or for that matter at any time when equal partnerships or parallel policies are unavoidable. A dispersion and weakening of Aim is, however, implicit in such conditions, and it should aways be our endeavour to achieve a single governing policy. Co-operation should then mean co-operation by all towards maintaining the Aim—i.e., a positive willingness to recognize and sacrifice less important interests in favour of the needs of the deterrent. Co-operation should not, as is too often the case, mean everybody being nice to everybody else ; nor should it lead to the prejudice of essentials through well-meant efforts to help things which, though attractive or traditional, have little real importance.

SECURITY OF THE BASE

Of the remaining principles, Security of the Base is possibly the most important, and it is appropriate that it should be discussed at this point because this principle, too, can easily be used as a decoy from the Aim.

The lever is fear, the suggestion that the offensive force may be destroyed on the ground or deprived of its sustenance before it is able to finish its task. A secure base, we are told, is the pre-requisite of a successful offensive—and then, unless we are very careful, we find ourselves accepting the *non sequitur* that security can only be achieved through the warding off of enemy attack. Once in this trap we are hoist with our own petard, for have we not said that it is not worth while providing any resources for anything unless we can provide enough? From this point it is a short step to close defence becoming an aim in itself ; and indeed, so the argument continues, since Security of the Base is agreed to be a pre-requisite, then clearly we should build up the close defences before we can dare to turn our attention to the offensive.

Against the old weapons it was possible to give the base a fair degree of security, in the conventional sense of the word and through the conventional means. Against nuclear weapons such security is no longer possible, and we shall instead have to base our defence on dispersion and carefully planned independence of main urban centres, while we at the same time provide ourselves with a highly disciplined, trained and equipped reconstruction force.

Security of the Base will always be a good principle, though unfortunately not always capable of achievement. Under today's circumstances we must be satisfied with and plan for a second best, but at least reasonably practicable, policy of mitigation.

SURPRISE

The military ideal is to start war at a time and place of one's own choosing and without giving any warning. For obvious reasons this cannot be, and we have to accept that we shall never be able to achieve initial strategic surprise ; nor, so long as our Aim is prevention, have we any need of Surprise. There is no sense therefore in planning for it and we should rather establish that, however sound Surprise may be as a principle *of* war, it should not be rated as a principle *before* war. Before war the opposite—Publicity—is the principle that we should observe.

No enemy will be deterred unless he recognizes the threat as being something more than he is willing to take. Such recognition should therefore be made easy for him. Intelligence security regarding our capabilities is pointless, and we should instead publicize our proposal to build up a deterrent. and, having built it up and having satisfied ourselves that it can really do the job, we should force its existence and its intentions on the enemy's notice.

ADMINISTRATION

The rôle of Administration follows naturally from the foregoing. Administration, as a before-war principle, should be applied with two priority responsibilities. First, by providing for dispersion and for logistic independence of urban target centres, it will play its part in securing the base. Second, it must ensure that the users of the base can be fully ready—for an enemy will only be deterred if he knows that aggression will bring immediate and effective retaliation ; anything less than complete readiness on our part may well tempt him into taking a chance.

NOTICE TO CONTRIBUTORS

Articles and illustrations for the April, 1955, number must be posted in time to reach the Editor not later than:

1. From **Serving Personnel:** By 15th February, 1955 (for submission by the Editor to the Air Ministry for permission to publish).
2. From **Other Contributors:** By 22nd February, 1955.

The Editor will be grateful to receive copy earlier than these dates, having no staff to assist him.

It will be noted that there are no articles on sport in the current number.

The attention of Presidents of Sports Associations is drawn to the opportunity we offer for increasing interest, and consequently increased support, for their particular sport, by publishing high-lights of sporting activities with supporting pictures.

Articles with photographs for illustrating them should be sent to the Editor, AIR POWER, "Chaseley," South Cliff, Eastbourne.

To assist in planning the lay-out of this Journal, articles should be of 1,200 words (ie., two pages), 2,500 words (i.e., four pages), but should not exceed 4,000 words (i.e., six pages).

A. H. S.

RUSSIA'S TRANSPORT NETWORK

BY SQUADRON LEADER J. F. L. LONG, M.A., R.A.F.

In a previous article (AIR POWER, Vol. 1, No. 4, pp. 396-400) an attempt was made to give a very brief picture of the state of Russia's railway system today; in this, in a sense a continuation, the state of Russia's transport network as a whole will be considered. (See map facing page 400.)

THE TRANSPORT NETWORK ANALYSED

It is, perhaps, best to try at the outset to establish in our minds the relationship of the various branches of the transport network. Its backbone, as the article already referred to emphasized, is the railway system. This system, unevenly disposed though it is over the face of the U.S.S.R., links the widely separated centres of industry and serves as industry's main supply line for raw materials. Finished products are moved by it to markets sometimes thousands of miles distant. The exchange of goods between industrial and agricultural areas is also primarily the duty of the railways. This they must do all the year round for, unlike marine and road transport, the railways are not immobilized for long periods by the severity of the climate. In war, as Russia's transport chief Kaganovich stressed at the railway conference held in the Kremlin last May, it would be upon the railways that the greatest burden of all would fall of moving troops and supplies to the battle areas. Dislocation or partial destruction of the vital parts of this system would undoubtedly be a calamity of the first magnitude.

Much older than the railway system, and a valuable supporting service in certain areas, is the network of inland waterways, some quarter of a million miles of which are navigable. Although some of the greatest of the world's rivers lie east of the Urals (Ob, Yenisey, Lena and Amur), the network is most highly developed in Russia's western regions. This is not as surprising as it may seem, since all the great rivers (the Volga, Amu Darya and Amur excepted) flow northwards to empty into the Arctic Ocean and it is only comparatively recently that really serious attempts have been made to use them as freight channels. All are subject to severe icing for four and a half to nine months of the year, depending upon their location; seasonality is thus the chief limiting factor in their operation.

The western waterways offer considerable scope for the movement of bulky freight in both a north-south and an east-west direction. Where nature erred, man has altered. Today hydro-electric, irrigation and waterway improvement go hand in hand. By 1952 with the inauguration of the Volga-Don canal, shipping was able for the first time to pass from the Caspian to the Black Sea and from either, via the Volga, northward to Moscow and Leningrad, and thence into the Baltic or White Seas. East-west movement is possible from Ufa and Molotov (on the western slopes of the Urals) to Leningrad, Moscow and Rostov. A second great system of waterways, comprising the Western Dvina, Neman and Vistula in the north and the Dnieper in the south, also offers east-west as well as north-south movement. But the chief freight artery today, as of old, is the Volga which, with its main tributaries, deals with more than 50 per cent of all freight carried by Russia's inland waterways. This percentage is likely to rise still further in the next six or seven years.

One persisting factor that prevents the economic handling of freight by

[Courtesy "*Sovetskiy Soyuz*"

Tip-up lorries move across the Spillway dam at the Kama H.E.S. now under construction.

the inland waterways (charges for most goods are almost the same as on the railways, though delivery dates are four or five times longer) is the impossibility of equalizing the volume of freight carried on outward and inward journeys. In 1935, for instance, on the Volga the figure for freight carried upstream was 3.8 million tons per km. of route, but 1.8 million down. For the Kama the figures were 1.8 million tons per km. downstream, 0.2 up; for the Neva, 4.0 million down, 0.12 up; and for the Northern Dvina, 2.5 downstream with only 0.03 up. Of sorts of freight carried in the same year more than half was lumber, a ninth oil and a ninth building materials. Compared to the 84.5 per cent of all freight moved by the railways in 1953, the inland waterway system dealt with only 6.3 per cent. But in doing so it spares the railways from what could be a critical overloading.

Coastal shipping, including shipping working the Northern Sea Route, attracts just over 5 per cent of all freight. This figure is very small proportionately, but it disguises the real importance of the merchant marine's role. To this service falls the task of shifting mineral and other valuable freight from settlements strung out along the bleak Far Northern coast during a very short summer shipping season and transporting to these settlements equipment. food and other vital supplies. Soviet Far Eastern settlements from the Bering Strait to the northern tip of Sakhalin (notably Okhotsk and Magadan) are also dependent upon the merchant marine. In these areas it has no serious competitors; its chief business, in terms of volume of freight carried, however, is to be found in the Black and Caspian Seas where the oil ports of Baku, Astrakhan, Makhach Kala and Batumi handle a large proportion of freight.

Between them road transport and airways deal with 4.1 per cent of all freight traffic, though again this small percentage may disguise the peculiar importance of each. By Western standards, a road system exits only in European Russia; elsewhere the system is primitive still. Of a total of 1,354,800 km. of roads existing in 1938, only 87,500 km. were hard-surfaced. The rest were either "graded-dirt" roads (330,900 km.) or "natural-dirt" (936,400 km.). During many months of the year vehicular traffic cannot use these roads on account of rain or snow. By no stretch of the imagination can the network as a whole be regarded as adequate for a country of the size and importance of Russia. The chief role of the roads is for short-haul work, and in terms of *weight* of freight originated they bear at least twice the load borne by the railways.

The civil air lines also occupy a place of importance in the transportation system as a whole. At present they are probably carrying as much freight as Soviet road transport in terms of *volume* of freight carried. Exact figures are not available. Broadly speaking, the air routes radiate from Moscow and follow the trunk railway lines fairly closely, though east of the Urals north of the 56° line of latitude, in an area more than twice as big as the whole of European Russia, they provide, most of the year, the only really efficient means of transport. Towns and settlements along the northern coast are already being served from Leningrad, while in the Caucasus and Central Asia, civil aviation supplements an as yet thinly developed surface transportation system. Towards the end of 1954 the total length of route operated had reached the figure planned for 1950, that is, 175,000 km.

SOME IMPORTANT DEVELOPMENTS

The Malenkov administration quite obviously does not believe that the transportation system it has inherited is either efficient enough or adequate enough in shape, size and organization to meet the needs of an expanding

[*Courtesy "Sovetskiy Soyuz"*

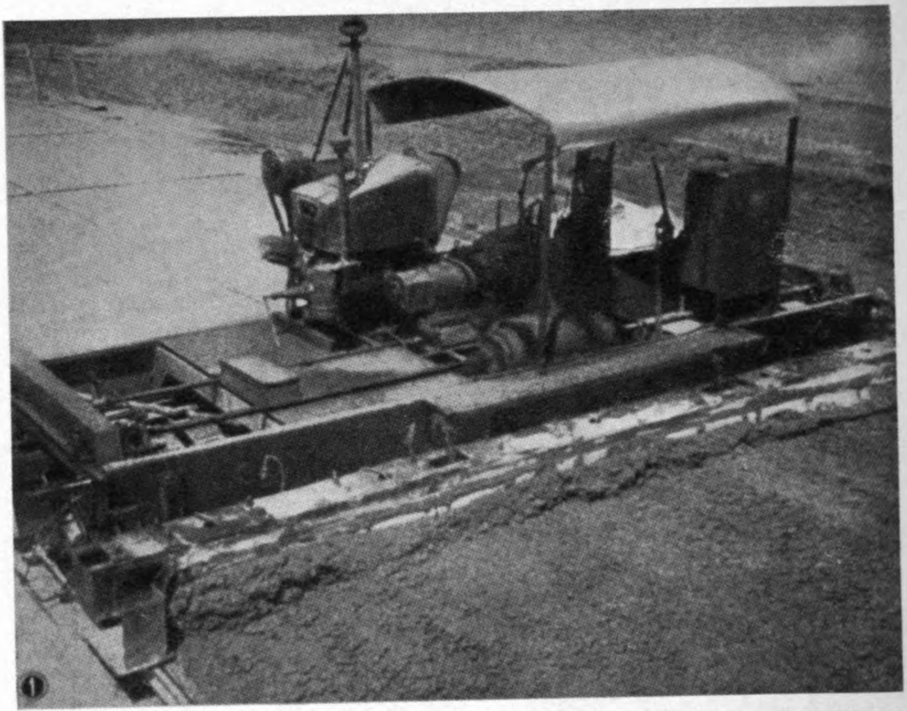
A T-4 diesel locomotive, produced at the Kharkov engine works, for heavy traffic duty.

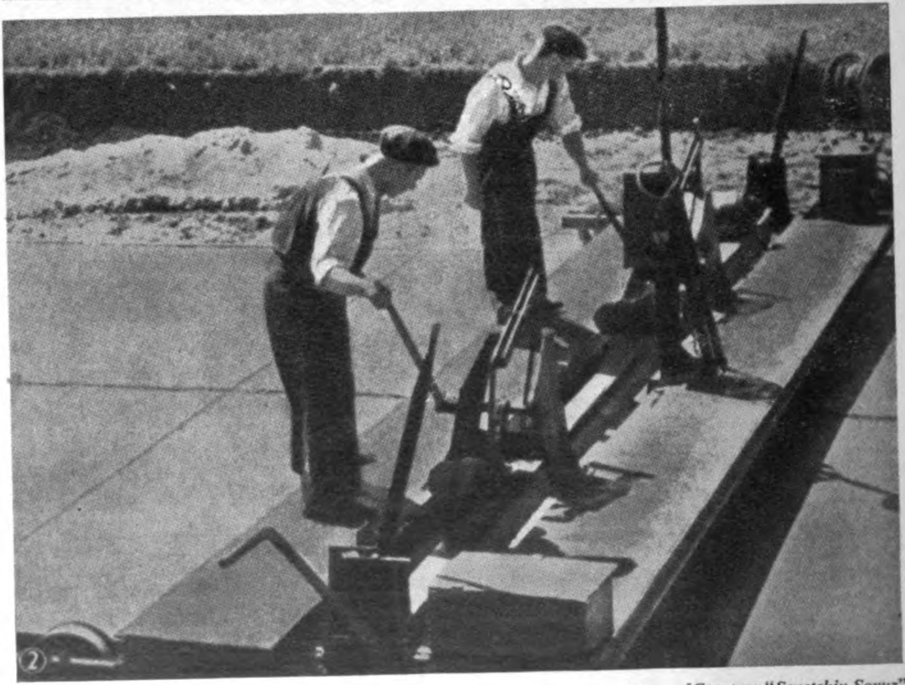
economy. It has outlined the direction in which a number of improvements have to be made quickly. By "quickly" a period of five or six years is meant, and already tremendous pressure is being exerted at the centre to see that objectives are attained.

The chief hopes of the new administration rest on the railways. Broadly speaking, much heavier freight trains (of up to 4,000 tons) are envisaged, running at higher average speeds on better track. Last May Kaganovich indicated that the administration based its plans for the railways on the assumption that they would be handling "not less than 50 to 60 per cent" more freight by 1960. Electric and diesel traction is clearly regarded as being part answer to the problem of the heavier train. Of the 6,000 new locomotives required by 1960, 4,000 are to be either diesel or electrically driven. Much heavier steam locomotives are also to be developed, including an improved "L" type (see picture on p. 396 of AIR POWER, Vol. 1, No. 4) with booster and a new 2.8.0 + 0.8.4. "coupled engine." These additions will keep the average age of the Russian locomotive pool down to the lowest in the world (in 1953, 82 per cent of all railway work was being done by engines less than eighteen years old). Production of goods rolling stock is being increased, though the position is probably already satisfactory given efficient operating conditions. Main track is to be given a good bed, and much double tracking of main routes is to be carried out. Electrification, which has been progressing at a snail's pace since 1946, is to be hurried forward so that by 1960 19,000 km. of electrified lines (or about ten times the 1940 mileage) may be in use.

At the same time the capacity of the network is to be improved and new and important links established with China. By the Soviet-Chinese declaration of October last, the line now being built from Lanchow to Yunmin is to be extended north-westwards to Urumchi and thence westwards to join the Turksib line at Alma-Ata. Another line will connect Peking via Paotow (on the Yellow river) with Ulan Bator (capital of the Mongolian People's Republic) and Ulan Ude, the great Soviet industrial centre east of Lake Baykal. The completion of both these projects (the Ulan Bator line should be open by next year) cannot fail to have far-reaching political, economic and strategic effects in a vast region hitherto completely rail-less. Within the U.S.S.R. the exit points of the Urals' lines are to be improved, especially those leading to the Volga valley. The carrying capacity of the Turksib will be increased, as well as that of the Donbas-Krivoi Rog-Dnieper route, vital to the economic well-being of the Ukraine.

Plans for the inland waterways, many of them now being carried out, are no less interesting. To judge from the new administration's list of objectives, there appears to have been a distinct shift of interest since Stalin died. It is now quite certain that the ambitious scheme for joining the Amu Darya river and Aral Sea to the Caspian by a canal (see AIR POWER, Vol. 1, No. 3, p. 262) has been abandoned in favour of a more modest scheme 300 miles farther south which will bring water from Kerki (on the Amu Darya) to Tedzhen (on the river of that name) and later to Ashkabad and beyond. This canal will not only permit navigation, but also improve, among other things, operating conditions on the Trans-Caspian railway. Of far greater importance to transport are the developments on the Siberian rivers Angara, Irtysh and Ob. Little is known of the Angara scheme, except that it is part of a long-term plan for regulating and utilizing the waters of that river, and that it has been started. The hydro-electric stations now under construction on the upper Irtysh (at Ust-Bukhtarma) and on the upper Ob (at Novosibirsk) will add two further inland





[Courtesy "Sovetskiy Soyuz"

MECHANICAL ROAD-BUILDING IN THE U.S.S.R.

Mechanical road building has been adopted in the U.S.S.R. (1) *shows a finishing machine:* (2) *shows seams being cut in the solid concrete road to preven tit from cracking in hot or cold weather.*

seas to the map of Russia, the Ust-Bukhtarma dam creating behind it a lake almost the size of Baykal. In the west, an extensive scheme for the regulation of the Volga's waters and those of its tributaries includes the construction of four dams on the Volga itself, three on the Kama and one on the Ufrinka (near Ufa), the net result of which will be to provide over 1,600 km. of deep waterways to shipping, none less than 20 km. wide. New and faster ships, including special tankers, are being built for these and other inland waterways.

Complaints, nevertheless, continue to be heard about the poor utilization of the water routes. Kaganovich himself pointed out how the non-metals like timber, coal, grain and consumer goods—all ideal shipping freight—were still being "conveyed long distances by railways running parallel to waterways." Many routes were either not used at all or only partially used. The amount of many types of consumer goods carried still had not reached pre-war levels by April, 1954. For this Kaganovich roundly blamed the watermen themselves. They did not try to increase the amount of freight carried ; what they carried they treated "in a dilatory fashion" or "carelessly." Nor did they utilize available shipping space properly. Kaganovich instanced how the carriage of cotton by water had actually dropped, although the volume of cotton transportation had increased ; there had to be an immediate increase in this freight on the Caspian Sea and Volga routes.

Very little information exists on trends in coastal shipping, motor transport and civil airlines. It is evident, however, that a considerable amount of research is being done in the Central Arctic in connection with the movement of cyclones and related ice drifts ; this would seem to indicate a deepening Russian interest in the possibilities of the Northern Sea Route, and it may well be that it is here that some surprising developments may occur in the next six years or so. So far as motor transport goes, there is good reason to believe that this is "increasing rapidly" (to borrow Kaganovich's own words). The range of vans and large and small lorries now being built in Russia is wide, but the utilization of motor transport generally is poor. The large cities will probably adopt centralized freight delivery services after the example of Moscow, but long distance services, except between some of the larger west Russian cities, seems most unlikely. The construction of paved roads is bound to go forward slowly. The expansion of the civil airlines in terms of route-mileage may well be slow also, although there are many signs that services on existing routes are being improved and intensified.

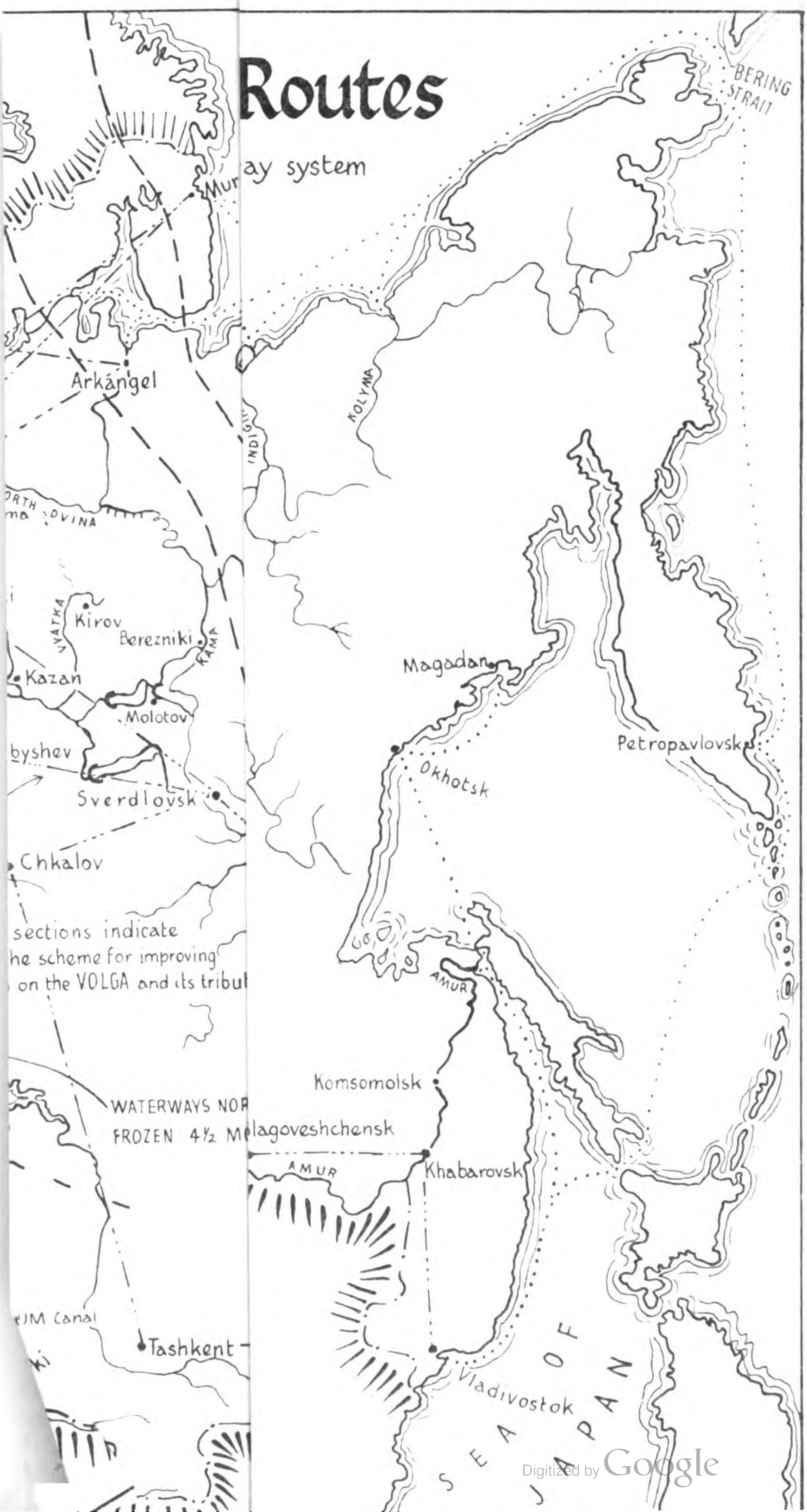
READING THE SIGNS ARIGHT

In conclusion, what are the outstanding features of this fast developing transport system? The first, obviously, is the absolute predominance of the rail network. Its importance has been most aptly compared to that of our own mercantile marine ; certainly without its functioning properly (to quote Kaganovich) "no normal metabolism would be possible in the Soviet Socialist society." Yet, despite this, investment in this network, though adequate, is not generous. From this we may conclude that, even assuming that all the planned improvements of the railways are carried out by 1960, the network will not be able to do more than keep pace with industrial and agricultural expansion. It seems most unlikely, to 1970 at least, that the policy of building up self-sufficient economic regions—the aim of the Russian leaders since 1939—can do much to ease the strain under which the system operates and, for many years to come, we may expect the system to remain peculiarly sensitive to the treatment it receives from within, or from without, the U.S.S.R.

A second feature of the transport system is its growing complexity and the increasing dependence of its branches upon one another, and upon other sectors of the economy. The planned electrification of many of the trunk rail routes depends to a large extent on the supply of cheap electricity from the hydro-electric stations now being built. The improvement of navigation on the inland waterways only becomes a possibility when the barrages of these stations are complete and lock systems installed. This, in turn, will permit the use of larger and faster ships and the movement of greater tonnages of bulky freight by water, notably in the Volga region. Where watersheds cannot be negotiated by canals and locks, and where railway construction is impracticable, the opening up of new motor roads may be expected. (Recently, it is interesting to note, the Siberian rivers Lena and Nizhnaya Tungaska, separated by thick forest and mountains, were linked in this way.)

A third and last feature may be distinguished in the increase in the number of strategic routes and in the changing character of some of the older ones since the end of the Second World War. The scale and rate of this particular type of change is, however, extremely difficult to assess, though its importance will be readily appreciated. This year, for instance, the excessive strain that has in the past been placed on the Tran-Siberian line has been eased by the opening of the South Siberian route as far as Abakan, while the comparative isolation of the light industries in the Tashkent area from good coal resources has been lessened by the completion of the Mointy-Chu link on a direct route to the Karaganda mines. With the construction in the near future of the Saratov (Volga)-Kungrad (Amu Darya) line, sub-tropical southern Central Asia will be linked directly with the great industrial regions of Russia proper by four routes in place of the one in existence a quarter of a century ago. The complexion of a fifth route, the Trans-Caspian from Krasnovodsk, is changing gradually. Oil from Baku enters Central Asia by this route at present and textiles and sub-tropical goods leave by it, for transportation by water to Western Russia and the Urals. The development of the south Kara Kum desert region will undoubtedly further enhance the usefulness of this line. Far to the east, an extension of the North Siberian line from Bratsk to the River Lena has been recently reported.

It will obviously be important for us to keep pace with changes like these. (Our thinking about Russian economic development generally tends to be at least five, and often ten, years behind the times.) Within a few years, for instance, with the completion of the two lines from China, our notions of the dependence of Russia's southernmost frontier regions upon a skeleton transport system will have to be radically revised. Again, the remarkable series of improvements to the great Volga waterway will have to be assessed and carefully related to the development of the powerful industrial region along the banks of the river's middle and lower reaches. The arrival by rail in the industrial Urals areas of increasing quantities of coking coal from Karaganda is already lessening the dependence of the Urals on supplies from the distant Kuzbas and may lead to the diversion of Kuzbas coal to the small but growing industrial regions of the Soviet Far East. Efforts to harness the resources of the Russian Far North (by railway to Salekhard on the lower Ob, by air and by sea), if successful, might well have important economic and far-reaching strategic effects. The problems facing Soviet transport have only to be stated in these terms for us to realize that rapid change will be a feature of the system for many years to come, but in this change we may be able to discover some pointers to the intentions, and the fears, of the present Russian leadership.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ROYAL AIR FORCE TECHNICAL COLLEGE—HENLOW

Graduation Ceremony of No. 2 *Entry of Technical Cadets (University)—24th September,* 1954

By Wing Commander H. R. P. Patterson, O.B.E., M.A.

WHEN a ceremonial parade is to be reviewed by no less a personage than the Chief of the Air Staff, the Parade Commander and those under his orders are put to a severe test. When the drill and inspection has to be carried cut under difficult weather conditions the task is even more exacting.

The Henlow Cadets under their Parade Commander, Technical Cadet D. J. Sledge, deserved the congratulations which they were later given on their excellent performance when on 24th September, 1954, Marshal of the Royal Air Force Sir William F. Dickson, G.C.B., K.B.E., D.S.O., A.F.C., reviewed the Graduation Parade. With him on the Saluting Base were the Air Officer Commanding-in-Chief, Technical Training Command, Air Marshal Sir Victor Groom, K.C.V.O., K.B.E., C.B., D.F.C., and the Air Officer Commanding and Commandant of the Technical College, Air Commodore C. L. Dann, C.B.E., B.Sc., F.R.Ae.S.

The Chief of the Air Staff presented the Norton Sword—a challenge trophy awarded to the University cadet who has achieved the highest all-round standard—to Technical Cadet J. J. D. Brown.

The presentation of the Franks Trophy to Technical Cadet D. J. Sledge for achieving the highest standard in General Service Training took place in the Assembly Hall in the presence of parents, guests, students and staff of the College. There followed the presentation of the Mathematics Prize to Technical Cadet J. L. Seldon and of the Science Prize to Technical Cadet J. J. D. Brown.

The Commandant in his opening address said how delighted he was to welcome Marshal of the Royal Air Force Sir William Dickson as Reviewing Officer. This he thought reflected the importance of the Technical Cadet Scheme.

The progress of aeronautical science was very rapid. As the Red Queen said to Alice, "You have to run twice as fast if you want to get somewhere." In the Air Force we have to fly twice as fast and far and twice as high as we did ten years ago to keep pace with our rivals. Training had to advance in step with those requirements.

Today twenty-one cadets would pass on to universities to read for honours degrees. During the year of academic study at Henlow he hoped they had developed love and pride of the Service which would fit them to assume the dignity of rank which they would carry on entering university life. They would remain under the Commandant's jurisdiction and he would supervise their progress and general well-being at University. Whilst their life at Henlow had been highly disciplined, their new environment would be traditionally unrestrained. He advised them to cultivate the habit of self-discipline and to get down to hard work in their studies from the very beginning, since they would be in competition with young men whose scholastic attainment was very high. In this matter he asked for the support of parents.

Most parents are primarily concerned with their boys' health and happiness. He could assure them that all the boys had developed physically and their health had been excellent.

[*Crown copyright*

Back Row.—Technical Cadets H. R. Simpson; N. Rolling; M. I. Thom; M. J. D. Brown; G. C. M. Miles; J. G. Carter; N. Wilson; J. C. Woolley.
Centre Row.—Technical Cadets M. R. M. Heyes; B. Brimelow; W. B. L. Hallam; J. D. Jackson; C. J. Hyatt; R. D. Gommo; K. A. Campbell, D. A. Watson.
Front Row.—Technical Cadets B. R. L. Easton; J. L. Seldon; J. J. D. Brown; Marshal of the Royal Air Force Sir William F. Dickson, G.C.B., K.B.E., D.S.O., D.F.C.; Squadron Leader G. H. Davis, D.F.C.; Technical Cadets D. J. Sledge; C. W. V. McCleery.

The Service expected all young potential officers to work hard and play hard. This entry had had a successful rugby season and at hockey had won the A O.Cs. Cup. Rowing had been taken up with enthusiasm, both "four" and "eight" competing with credit at several regattas. Initiative and enterprise has been shown in the vacation activities, including mountaineering in France and Scandinavia, gliding in Germany, canoeing in Eire, bear hunting in the Ardennes and adventures on the sea and in the air.

There had been a proper interest in spiritual matters. Apart from the formal weekly church parade, cadets had attended weekly services. They are a mainstay of the choir at St. Andrew's Church. The Commandant hoped that these associations would continue at their universities.

The Commandant concluded with these words. "You are pioneers of a scheme whose success will turn largely upon your efforts. The Royal Air Force will await your emergence from University with critical expectancy and future technical cadets will be influenced by the character, ability and performance of the early entrants. You leave Henlow with these responsibilities, which I know you will accept willingly and discharge with credit. You take with you the warmest wishes of my staff and myself for your success."

After the Chief of the Air Staff had presented the awards and prizes he gave an informal address to the cadets, their parents and friends.

In spite of bad weather, he said, it had been a good parade and had given him much satisfaction. This was the cadets' special day. They had completed the first stage in their career and now they were off on their next step. Everybody would share his high hopes for their future, and thanks were due to the Commandant and his staff for giving them the best possible training.

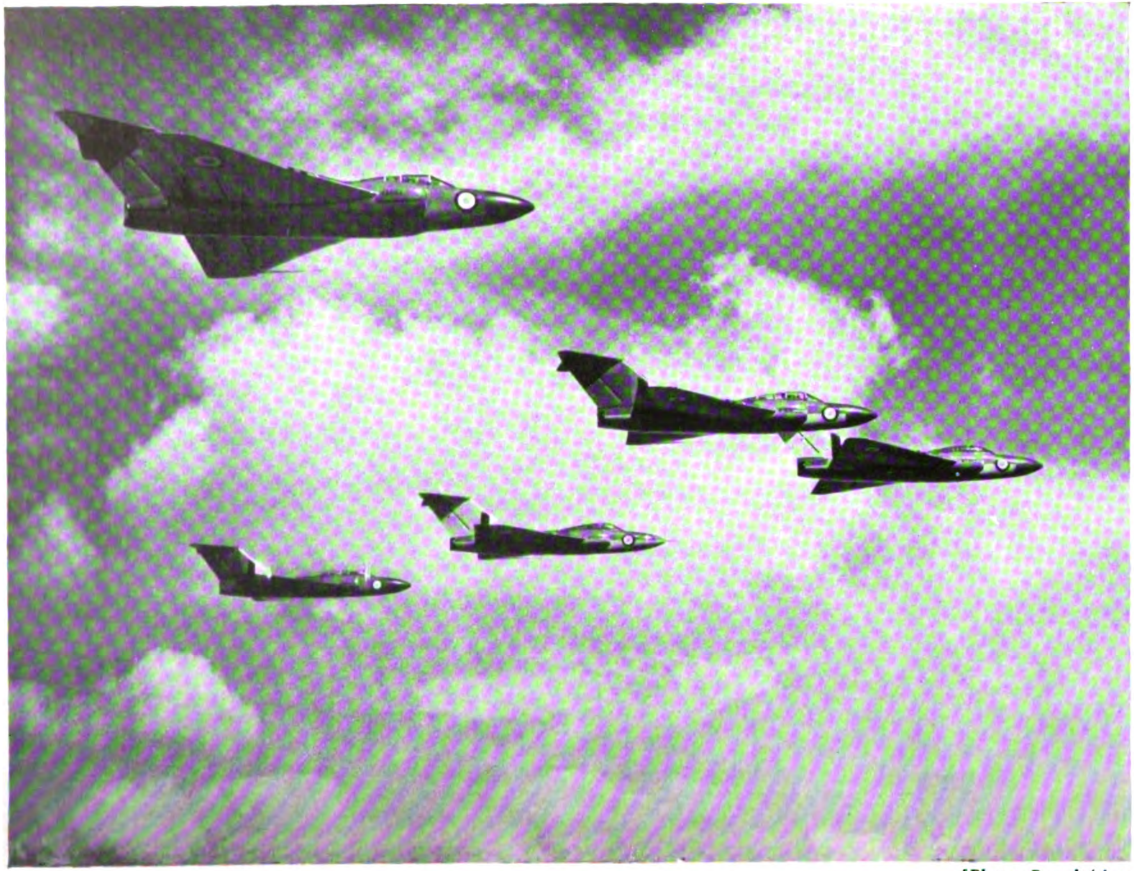
He referred to the technical cadets who were staying at Henlow. They had not yet had a graduation ceremony, but their turn would come. They had no reason to envy cadets embarking on university careers for in point of fact they would have no special advantages over those who stayed at Henlow. Some would go to research and development work and others to the maintenance of R.A.F. equipment, which was becoming ever more complicated. In the future there would be guided weapons and manned aircraft working together and, looking further forward, there was the long range missile. Our job was not only to achieve technical superiority but to make it manifest that we had achieved it and could keep it.

Qualities of leadership and the ability to make decisions were essential. If ever we had Press-button Warfare, someone had to decide which button to press and when. The cadets would have not only a fine technical training but also a first-class general education. They were to be trained to fly and get their wings. They must learn to lead and control men. With all these qualities they should be well equipped for the tasks ahead.

This was not the occasion when he could review all the work and problems of the future. The accent was on electronics and applied science, but the technical officer must be able to keep the scientist's feet on the ground. He must combine theoretical understanding with practical knowledge.

C.A.S. repeated again his pleasure in visiting Henlow that day. He had high expectations of those graduating and he hoped they would live up to them. They must have a great sense of responsibility and dignity, but at the same time they must preserve their sense of humour and in no way be dismayed by problems which would confront them.

He endorsed the congratulations of the Commandant and wished the departing cadets good luck in their future environment and studies.



[Photo: Russel Adams

GLOSTER JAVELINS

These all-weather fighters of tremendous power and endurance are stated to be the first designed to fly and fight at over 50,000 feet.

CURRENT EVENTS

Unprecedented Demand for British Fighter Aircraft

COMMENTING on reports of United States Air Force orders for Gloster Javelin and Hawker Hunter fighters, a spokesman for the Hawker Siddeley Group said:

"Naturally we are delighted with this renewed mark of American confidence in our products, particularly so since this is the first official word that has come through from the U.S.A.F. on the Gloster Javelin. This remarkable all-weather Delta fighter is powered by another Group product—twin Armstrong Siddeley Sapphires.

"We believe the Javelin to be the most potent and advanced fighting aircraft of its kind anywhere. It carries very heavy armament, has long range and its complex radar gear enables it to fight day and night and in any weather. It has an extraordinary rate of climb enabling it to be in combat readiness over 50,000 feet in very few minutes. It is the R.A.F.'s forward line of defence against high level, high speed atomic attack—and its production is ahead of schedule.

"The Hunter is, of course, the primary day interceptor of the Royal Air Force and has been ordered not only by the R.A.F. but by the United States, Sweden, Denmark, Belgium and Holland."

Fourteen foreign Air Forces, including Commonwealth, Middle East and South American, have notified Hawker Siddeley Group in London that they are directly interested in the Hawker Hunter, the R.A.F.'s new swept-wing, supersonic, interceptor fighter.

With this announcement came word from Hawkers that the Hunter has now achieved the record-breaking total of £121 million in orders in addition to British Government orders for the R.A.F. This £121 million far surpasses any other aircraft order or indeed any other order for any single British product, and included in it are a string of record-breaking direct exports.

Commenting at his Kingston headquarters, Mr. Neville Spriggs, Hawker Managing Director, said:

"Largest of our export orders is the $182 million placed by the U.S. Government for N.A.T.O., and included in this are U.S. deliveries to the R.A.F. under the American off-shore procurement programme.

"Second and third largest orders are from the Dutch and Belgian Governments for their Air Forces, with sub-contracting of Hunter production to be carried out under licence in Dutch and Belgian factories. These two orders amount to $117 million.

"In addition to these U.S., Dutch and Belgian orders for $299 million (£106,785,000) we have also received orders from the Swedish Government for £12 million and the Danish Government for £3 million."

The size of the Hunter order from the British Government for the R.A.F. may not be revealed for security reasons.

Deliveries of the Hunter are now flowing to the R.A.F. and production is going forward at the Kingston, Surrey and Squires Gate, Blackpool, factories of Hawkers.

"Hawker Sea Hawks, now being produced by Armstrong Whitworth, another member of the Hawker Siddeley Group, have received orders from the U.S. Government for $18,400,000. These are in addition to orders for the Royal Navy for this carrier-based fighter."

Jumping from Fifty Feet

One day recently a Gloster *Meteor* was skimming over the fields of Oxfordshire at more than 500 m.p.h. To watchers on the ground, the fighter seemed to be practising hedge hopping, because it was flying only 50 feet above ground level. For a moment onlookers thought something had gone wrong, because suddenly an irregular bundle was hurled upwards from the cockpit. Seconds later the bundle descended gently to earth by parachute.

The bundle was a dummy pilot, simulating an emergency jump. The drop from so low a level was made possible by a Martin-Baker ejection seat. An idea of the improvement in safety brought about by this seat can be gained from the fact that in World War II it was thought unsafe to jump from less than 1,000 feet using a standard aircrew parachute. Now even at a height of only 50 feet, jumping is practicable, and the company hopes to reduce this minimum to 25 feet.

How it is Done

Using this ejection seat, a pilot need only jettison his canopy and then pull down a face-protecting shield. He is fired upwards immediately by a cartridge mechanism, clear of the aircraft's tail. Automatically a small drogue opens, to tilt his seat back and to control the opening of a larger drogue, ensuring that the latter does not split. This large drogue steadies the seat, slowing it down, and allows the pilot to drift clear with his own parachute now fully opened. It is claimed also that within ten seconds of leaving the aircraft, the pilot can be safely on the ground, ready to fight again if the need arises. The whole process is fully automatic from the moment when he says good-bye to his aircraft by operating his face-shield, to the moment of touching terra firma.

R.A.F. Sunderlands leave Korea

The Royal Air Force has now withdrawn its units from the United Nations Forces in Korea in accordance with the Commonwealth plan. The last of the ground crews has followed the Sunderland aircraft back to the Far East Flying Boat Base at Seletar, Singapore, leaving only a small closing-down party.

It was from their advance Headquarters at Iwakuni, in Southern Honshu, Japan, about 100 miles across sea from the Korean coast, that Nos. 88, 205 and 209 Squadrons maintained sufficient aircraft to fulfil operational commitments in Korea and Malaya. The Far East Flying Boat Wing, now commanded by Wing Commander George Burges, was formed in February, 1950. Five months later, and only one month after war began, aircraft of No. 88 Squadron flew from Hong Kong northwards to take part in the first of many operational patrols of the war. The three squadrons took their turn to work side by side with units of the U.S. Navy and other United Nations Forces in providing an offensive blockade of Korean waters. Patrols were long and often arduous. Cold was the worst enemy, 24 degrees of frost inside unheated, draughty Sunderlands being a common experience. The truce brought no respite for these three hard-worked squadrons, which were by then required to take their turn carrying out surveillance duties round the Korean coast.

The decision to withdraw the R.A.F. from Korean waters was followed later by the disbandment of No. 88 Squadron. No. 205 Squadron was then at its base engaged on anti-terrorist patrols in Malaya. No. 209 Squadron was the last to make the 3,000-mile journey from Korea to Seletar.

INTERNATIONAL UNDERSTANDING—THE AIR FORCES' PART

BY GROUP CAPTAIN BRUCE ROBINSON, C.B.E., A.F.R.AE.S.

IT is a commonplace that air travel and radio (and the two are inseperable) have combined to shrink the world. Add a third major 20th-century development, the growth of nationalism and the granting of independence to nations hitherto fathered by Britain, and consider the joint effect of these processes. Britain has felt the effect perhaps more than any other power; no longer is she a "right little, tight little island." Instead she acts as the hub of a vast and powerful dynamo, whose windings are complex, designed to produce freedom.

It is in the last ten years that the rate of this change in Britain's position and responsibilities has been greatest. The Dominions have grown in stature and have added much strength to the Mother Country. Offset to this is a weakening of the Commonwealth ties through the establishment of the Republics of India and Pakistan, the movement towards a republic in the Union of South Africa, the grant of independence to Burma and an increasing measure of self-government to certain colonies in West Africa and the West Indies. Though the structure of the Commonwealth has changed, her strength remains unimpaired. She remains virile, keeping pace with the times and suiting her structure and working to changing conditions. Indeed, the Commonwealth strength increases rather than diminishes. Britain, the Mother Country, must keep pace with the times too, and adjust her handling of the family as it reaches the years of maturity. She must learn to understand the members of the family much more than was ever necessary before. In short, international understanding has become a prime factor, even within the Commonwealth.

While the rumblings and stress of the change within the family of the British Commonwealth have been going on a tremendous transfusion of strength has been received from another branch of the family, the United States of America. This bond of friendship, cemented in two world wars and born of a common devotion to the rights of man, forms the core of the "Freedom dynamo." Its efficiency can, however, be impaired through lack of understanding. The need for the British and the Americans to understand each other was never greater. The point was made recently by General Sir Francis de Guingand (Montgomery's Chief of Staff in the Second World War) in an article in *The Sunday Times*, when he advocated the regular interchange of 1,000 men and women from Britain and 1,000 from America for reciprocal study tours. Again, the key to strength is international understanding.

In the design of the "Freedom dynamo" there has recently been incorporated an important modification, a component known as the Western European Union. This, of all developments over the last ten years, affects Britain more than any other. We are now, with certain reservations, committed on the Continent in a way we have never been before in our history. We have become a Continental land power and involved in Continental strategy. At the same time, we have more and closer friends there than we have had previously, and here, of all places, there is clearly a tremendous need for international understanding. This particular part of the dynamo's windings are not only complex but tenuous, and clearly will need careful attention to keep intact.

The point has been made that today, after ten years of rapid and great changes of the structure of the free world, Britain, the Commonwealth and her Allies are potentially stronger than ever before in history (not necessarily relatively stronger than the potential threat). At the same time the change has necessitated a change of outlook on Britain's part from one of "Island and Empire" to an international one. It is vital that we understand "the other fellow," make allowance for his views and gain his confidence, so that he in turn will understand and trust us.

It is not, however, only among our Allies that we must cultivate this understanding. Obviously if we understand the potential enemy we shall be in a better position to handle him. But there are also the nations on the touchline, the border-line nations who may either go to the enemy camp, join the nations of the West or compromise and try to remain neutral. This is a field in which international understanding will pay dividends.

It may be thought that the foregoing has been a prelude for a build-up for the Diplomatic Service. The truth is that the task of developing international understanding is everyone's. The example is set by the Royal Family; after them statesmen, politicians, industry, commerce and the Services, all have a part to play. The R.A.F. and the Air Forces of the Commonwealth, by virtue of their world wide service do, in fact, play a considerable part, and one which could be expanded.

The maximum application of the exchange policy offers a fruitful field for the development of international understanding. Exchanges to the States and throughout the Western Union could, perhaps, be increased in number, and extended to cover all ranks. Throughout the Commonwealth Air Forces the same process could profitably be developed. Exchanges of units as well as individuals should be fostered. When thinking of the Commonwealth exchanges, India, Pakistan, Ceylon (and Burma) should not be forgotten, though there may be political difficulties, because it is in this part of the world that Britain, who for so long had many good friends, is today, through having no fighting services in those countries, suffering the greatest loss in its international knowledge. Exchanges should be on an equal basis and, wherever possible, be to executive posts rather than as "advisers." Apart from the gain in international understanding the added professional training to be had by the participants in an exchange is considerable.

Without going so far afield there are also steps that can be taken within the R.A.F. at home to enable the Service to play its part in Britain's adjustment to the changed and shrunken world. The Royal Institute of International Affairs has run, at Chatham House over the last few years, no less than one hundred courses for the three Services. These have done a tremendous amount of good and constitute an essential part of an officer's professional training today. But it is doubtful if the most is made of them. How many officers on return to their units from Chatham House deliver a lecture (or two) so that Chatham House's work finds a wider audience? As an incentive to those attending Chatham House and to emphasise the importance attached to cultivating international understanding, the Services could, in conjunction with Chatham House, institute an essay competition, the prize for which could be a study tour.

With the "permanent" commitment of British Services to the Continent, study of a foreign language, French, German or Russian, should be widely encouraged. This need not necessarily be to the full interpreter standard, but nevertheless to a definite standard. A "pass" at this standard should carry with it the incentive

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NOTES FROM THE FAR EAST—II

By Wing Commander C. N. Foxley-Norris, D.S.O.

THE opening article in this series gave some first impressions of service in the Far East, and these, like all such impressions, may have been fallacious or overhasty on occasion. However, after further time for reflection, there seems little reason for a major revision of them. The bizarre may have become more commonplace, the unusual more routine, and the gilt flaked here and there off the gingerbread, but there are still many new things to enjoy and fresh tastes to savour.

Mention has previously been made of the undesirability of the typically "Englishman abroad" attitude to foreign service, the insularity that closes eyes, ears and nose to all but the accepted and familiar, and the prejudice that confines all activity and interest to the airfield, the mess and the married patch. This point cannot be over-emphasized. Those who wear these self-imposed blinkers not only waste a golden opportunity to widen their horizons, but also deprive themselves of some of the most enjoyable aspects of service abroad. Contact with the indigenous population is the first essential for full appreciation of what that service could and should mean.

The population of Malaya and Singapore is very mixed, the main race groups being Malays, Chinese, Indians, and, fewer numerically, Europeans. The first two constitute by far the larger proportion of the population, Malays predominating in the Federation and Chinese in Singapore Island, although the margin is small in each case. Herein lie many problems and complications both for the present and the future. On the surface today there is little friction between the two races ; indeed in their aspiration for independence they have joined forces, the Malayan Chinese Association and the United Malayan Organization having allied themselves politically for practical purposes. However, they make strange bed-fellows, and when the split comes it promises to be a dangerous one.

The Malay is outwardly a cheerful, happy-go-lucky fellow, living largely for today. kindly, generous, even spendthrift. However, if roused to any especial enthusiasm, he can be a fanatic and then displays a different side to his character, as at the time of the Bertha Hertogh riots. Well led, he makes a good soldier, airman or policeman, a tough fighter and a loyal supporter. He volunteers in large numbers for the various armed forces, and predominates in the locally raised services and police. It remains to be seen what effect that predominance may have in determining the eventual future of what he regards as his own particular country.

The Chinese presents a more complicated problem, typifying the traditional mysteriousness of his race. His is an old culture and civilization, and not every aspect of them is readily intelligible or agreeable to Western thinking. Patriotism or civic duty in the Western sense plays little part in his scheme of things, and this trend is naturally accentuated in the case of the Malayan Chinese, whose loyalty, such as it is, is divided between his original home and the country of his adoption. The actual and potential hostility between their existing régimes makes his position awkward, and he solves the problem for the time being by fixing his seat firmly on the fence and his eye equally firmly on the main chance.

This is not to say that the philosophy of the Chinese is purely selfish and material. On the contrary, his attachment to the object of his own loyalties, particularly the clan and the family, is intense and paramount. When he recognizes such a loyalty he is extremely generous and will make any sacrifice for those whose claims on him he acknowledges. He is a keen and astute businessman, but an inveterate gambler who, rich or poor, will risk his last dollar on the turn of a card, or more often a mah-jongg piece or lottery ticket. He has a great sense of humour and the ridiculous, and his pose of self-deprecating modesty can be most entertaining. Nevertheless, should any loss of face occur, intentionally or accidentally, in business or social affairs, humour beats an immediate retreat and the restoration of good relations is a long and delicate process. The paradoxical contradictions of his nature require, and merit, much study.

The Chinese is a charming and generous host, whose standard of hospitality is high and rigid—not to say dangerous. He is a hard drinker who, like the Russian, drinks his toasts standing, neat and at a gulp; his guests, to avoid offence, must follow suit. The ceremony is preceded by cries of "Yam Seng" (bottoms up), becoming louder, more frequent, and more staccato as the evening progresses. Unfortunately, for the guests, however, custom permits the host two advantages. Firstly, he is in a position to give his servants prior instruction that every third, or even second, drink poured in his own brandy glass (brandy is much favoured locally before, at, after and between meals) should in fact be cold tea, a privilege not extended to the guests. Secondly, local etiquette finds nothing unusual in the host at a later stage being raised and lowered from his chair for Yam Senging by a couple of the aforesaid servants. Here again the guest, depending on natural resources, is up against heavy odds.

Local drinking habits have few subtleties; at dinner a bottle of brandy or whisky stands by the plate, to be shared between two or at most three guests. The cuisine is, however, much more interesting and varied. Most of the traditional dishes are well known, the shark's fin soup, the sea slug, and the hundred-year-old egg. Incidentally, the age of the latter is much exaggerated; an egg is considered of quite reasonable vintage, and palatable to all except the strictest gourmet, at any age over three years. Dinners frequently consist of up to fourteen courses, and unfortunately, particularly in open-air restaurants, neither their number or order is predictable. The dishes, of astonishing volume and variety, are served as each happens to reach the correct stage of preparation, and it is thus almost impossible to adjust one's consumption to appetite in order to last the full meal, which is socially essential.

The duration of parties at certain times of the year is just as unpredictable. These are the moon-flower parties. A particularly beautiful local flower, something akin to a water-lily, blooms and dies in one night; and the party coincides with it. The guests assemble; the flower opens; eating and drinking commence and continue; finally the flower suddenly withers; the guests may then follow suit. The trick to be watched here is a tendency for a thirsty son of the house to substitute surreptitiously a more recent and fresher bloom when the original one shows signs of imminent decease.

The chopstick is the universal eating implement, and takes rather less mastering than might be imagined. The secret, as in golf, is to keep the head well down. The closer the proximity between mouth and eating bowl, the greater the intake and the less the spillage. Chinese gentlemen of the old school can transfer a bowlful of any nourishment to the mouth in under two minutes, and the whole spectacle has something of the dignified efficiency and persistance of a Thames dredger in high gear. Conversation meanwhile is at a discount, but certain social conventions replace it. Choice morsels such as a fish's eye-ball may be selected and fed courteously to one's neighbour. Service wives should, however, watch their step here. The acceptance of three such titbits from the same gentleman at one sitting amounts to a tacit agreement by a lady to the status of concubinage. There is considered to be nothing immoral or disgraceful about this position, which is indeed much sought after and sparingly bestowed; nevertheless, its acceptance, especially towards the end of a tour abroad, may lead to obvious complications.

The Chinese are a talented and cultured race, and the products of their artists and craftsmen are highly prized but reasonably priced, so that even the service man may find something worth while within reach of his pocket. Nevertheless, discretion in choice should be practised, for what may delight the eye in Singapore too often clashes distressingly with the contents of cottage, flat or quarter at home.

The high degree of Chinese culture and civilization is nevertheless accompanied by a great amount and variety of superstition. The personal devil, previously described, is only one of a whole hierarchy that surround the Chinese in life and, worse still, after death. Due precautions must be taken in both spheres. The devotion of the Chinese to his family and ancestors is evinced very strongly in his beliefs about the hereafter. It is essential both for the well-being of the deceased and the peace of mind of those left behind that the full and exact ritual of the funeral ceremony be performed. The devils, however, always alert to discomfort and dismay, also fully appreciate the importance of the occasion and are on hand in great numbers and enthusiasm to produce confusion and eventual disaster. On other occasions they may be placated, but here no holds are barred, the battle is *à l'outrance*, and no subtlety or device is missed by either side.

The first essential, therefore, for the funeral conductors is to try to disguise the solemn and sorrowful nature of the occasion. With this end in view the whole affair is organized on the lines of a picnic, bean-feast or bank-holiday outing. Every friend, relative or acquaintance is mustered, and hundreds of others recruited from Tongs, societies, or trades unions with which the deceased may have been connected. All are equipped with fireworks, gay flags, coloured hats and umbrellas, embroidered banners and bright clothing, and piled, laughing and smiling, into dozens of open lorries. With them, in a place of appropriate honour, go a large number of barrels of beer, highly ornamented and silvered for the occasion, sometimes embowered on a lorry, sometimes proceeding on special hand-operated vehicles of their own.

The final touch is given by the brass bands. No good funeral is complete without at least six of these, each twenty or thirty strong, and mounted on special lorries throughout the procession. Percussion is the dominant motif, and every instrument capable of producing a loud metallic clangour is thumped continuously and fortissimo, without any particular regard for tune or tempo.

The stage is thus set for the bafflement of the devils. The "mourners" are at their gayest and noisiest, assisted by the free beer now flowing; the fireworks rattle; the band adds its cheerful din. All this row has a definite purpose. As well as being liable to be fooled by all the jollity, devils are allergic to loud noises, especially in mid-afternoon, the chosen time for funerals. If things go according to plan they will, therefore, take but a cursory interest in the apparent picnic party, be distressed by the noise, and seek their prey elsewhere, leaving the funeral to proceed according to route and the deceased to a peaceful interment.

Lately, however, the devils, reasonably suspicious of the number of picnics that appear to rendezvous somewhat unsuitably at the burial grounds, have proved more difficult to avert, and their attendance at funerals, noise and gaiety notwithstanding, has become undesirably pressing. However, the mourners are still ahead of the game. The cortège, with full complement and sound effects, assembles behind the hearse and moves off; the more persistent devils duly accompany it, but its route to the burial grounds proves strangely devious and circumambient. In the interval the deceased has been whipped out of the back door of the house, in a plain casket into a plain van, as soon as the procession moved off; and is duly interred and comfortably devil-proof before the spoof cortège ever reaches the grave-side. Thus at present, as long as the groundwork and organization are sound, the forces of confusion remain baffled. There should be a moral here for service planners and administrators.

This has been merely a glimpse of some aspects of one racial group in the Far East. Multiply it by the number of such groups, and it is clear that here is a treasure-house of entertainment and education. Unfortunately, it remains true, as Confucius may have said, " There is none so blind as he who will not see."

INTERNATIONAL UNDERSTANDING—THE AIR FORCES' PART—

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of "qualification pay"; it could also be made an essential requirement for Staff College entrance.

Among the airmen, too, there is some scope in the compulsory and voluntary education fields for distilling, at least among the "brighter types," an interest in languages, the Commonwealth and international affairs. This is something the R.A.F. could give the more intelligent N.S.A. man—something of benefit to himself and of value in the aggregate to the country?

The R.A.F. is entering a new era of air war; weapons and tactics are changing. At the same time strategy is changing, through the impact of changes in the structure and outlook of the Commonwealth and her Allies. These changes imply an urgent need for greater international understanding. The R.A.F. and the Commonwealth Air Forces can play their part in this.

THE AIR FORCES IN PARLIAMENT

(*This article was completed on 10th November, 1954*)

A FUTURE WAR

SINCE the previous article in this series was completed (on 9th August, 1954), Parliament has been enjoying the greater part of its long summer recess (perhaps one of the few indications that we had a summer in 1954), and since its reassembly, the Air Forces have not figured directly in any of its debates.

Hence there is practically nothing of recent Parliamentary proceedings to be discussed here. We can, however, consider matters of Service interest, and particularly of Air Force interest, which will certainly engage the attention of Parliament in the next defence debates.

As *The Times* leader writer, with his usual acumen, pointed out on 22nd October last, the new Minister of Defence, Mr. Harold Macmillan, took up his duties "at a turning point." He was faced at the start with new problems, upon the solution of which may depend the security not only of Britain and the Commonwealth but of all the Western Powers as well.

What then are the special problems with which the new Minister of Defence and his colleagues in the Service ministries are faced? They are bound up in the fact that an immediate revision of methods of defensive and offensive warfare is demanded by the introduction of atomic and thermo-nuclear weapons which, as Field-Marshal Montgomery said in his lecture to the Royal United Service Institution on 21st October, 1953, will certainly be used by the Western Powers *if they are attacked*. Doubtless, Mr. Macmillan will be making a statement in the House of Commons on this subject when he has had sufficient time to settle himself on the box and to gather up the reins—probably before this article is printed. It is fortunate both for him and for us that, at the very beginning of his term of office, so distinguished and experienced a soldier as Viscount Montgomery of Alamein has made a public pronouncement of the situation as it is appreciated by the staff of the Supreme Headquarters of the Allied Powers in Europe.* Meanwhile, we, as well as the Minister of Defence, may study the Field-Marshal's brilliant and far-seeing appreciation, which should certainly be reflected in the next *Statement on Defence*.

Lord Montgomery pointed out that there were two aspects of the problem of the defence of the West: the political aspect and the military aspect. With regard to the former, he emphasized the imperative need for political backing in all N.A.T.O. countries. The need for political backing and for a common purpose was well stated in a leading article in the *Daily Telegraph* on 22nd October, 1954, thus: "If general war came, we should be faced with the monolithic power of a single nation—or, if China were involved, of two, each with its well-defined sphere." It is a matter for congratulation that the N.A.T.O. powers have established among themselves an unprecedented accord, as a result of the Nine-Power Conference in London. At the same time, our agreement with Egypt on the Suez Canal Base (which was discussed in the autumn, 1954, number of AIR POWER) has clarified the situation in the Middle East.

The military aspect of the problem, which presents the greater difficulties, naturally received much fuller treatment at the Royal United Service Institution.

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* It is expected that Lord Montgomery's lecture and the subsequent discussion will be fully reported in the *R.U.S.I. Journal*, February, 1955.

Besides asserting the inevitability of the use of atomic and thermo-nuclear weapons if the West is attacked, Lord Montgomery also asserted his conviction that any major war in the future would be dominated by air power. If both these assertions are true (and who can dispute them?) then our traditional conceptions of strategy and tactics will have to be drastically modified.

The lecturer drew a distinction between the cold war and the hot war. The cold war, he said, must be fought with conventional weapons, and so also must any small local wars that may break out from time to time. A hot war on a world-wide scale, however, would call for the use of new weapons. Thus a serious difficulty arises. Our fighting forces must be trained to the use of conventional armaments; but at the same time they must be ready to turn over to the new weapons, with all the differences in organization that may entail. And it will be of no use to try to graft the new weapons on the old organization.

If a global hot war is to come, Lord Montgomery said, it may break out in one of two ways. It may be "precipitated by miscalculation," or it may be "deliberately planned" and launched in circumstances which favour the aggressor. In the former case, both sides would be taken by surprise and would, for that reason, be more or less unprepared. We should fight such a war "with the weapons we have got" at the time and "in the way in which our forces have been trained when it begins. . . . If we can react quickly (being prepared in peace time for such an emergency) we would win such a war."

The Field-Marshal contemplated a "deliberately planned world hot war" as having three distinguishable phases: (i) "A world-wide struggle for mastery in the air and of the oceans"; (ii) the "destruction of enemy land forces" not previously destroyed in the first phase; and (iii) "the bargaining phase" ending with the enemy's surrender. During the first phase "it will be vital to prevent enemy land forces overrunning and neutralizing Western bases and territories"; in the second phase, the West will exploit the favourable situation created in the first phase; and the third phase, which may be concurrent with the second, will be made decisive by overwhelming (Western) air power.

"Against the background of this over-all strategy" Lord Montgomery considered the war of the future under three headings: The war in the air, the war at sea and the war on land.

THE WAR IN THE AIR

"The dominant factor in future war," Lord Montgomery reasserted, "will be air power. If we lose the war in the air, we lose the war and lose it quickly!" And he continued: "The greatest asset of air power is its flexibility." Flexibility depends upon the methods of command and control, on the range of aircraft and on the mobility of supporting equipment. "Flexibility and centralized control of *all* the air forces in a theatre of war are vital to success. . . . Air power is indivisible. If you split it up into departments, you merely pull it to pieces and destroy its greatest asset—its flexibility." Lord Montgomery warned his hearers against the danger of basing their plans for a future war on the experience of the last two years of the Second World War, during which we enjoyed "almost complete air superiority." It would not be the same, he said, in a third world war; and we could not afford to sacrifice flexibility in our air command organization. Land-based air forces would have to provide all the air support needed by the land forces, and special training in that particular role would be necessary; but flexibility must not be sacrificed. "On occasions, the whole of the available air power may have to be used to help to save the armies from destruction; and the air organization must provide for such a contingency at short notice."

The Field-Marshal emphasized the importance of our being able "to start a tremendous nuclear bombardment of the East the moment we are attacked"; because this would greatly affect (to our advantage) the employment of the enemy air forces: "It must force them to devote a considerable part of their long-range air forces and nuclear weapons to an *attempt* to hit *our* strategical air forces and the installations on which they depend, and it must force them to expend effort on air defence."

Lord Montgomery then proceeded to examine the war in the air in each of three possible circumstances:

(i) If war were to come "in the near future," both sides would rely principally on piloted aircraft for both strategical and tactical purposes. The present balance in favour of the offensive in the air could not be upset; and we should still win if, by reacting immediately, we could gain the initiative and then establish our mastery in the air. But to do this we could not afford to rely on air resources which depended on mobilization. "The air forces we need, together with all the means necessary to keep them operational, must exist in peace time."

(ii) If war were to come "in the not-too-far-distant future," it is possible that the enemy might have created a sufficient stock of atomic weapons and the means of delivering them (principally by piloted aircraft) at long range and so be able to strike, at the outbreak of war, a devastating blow at our air power and its bases. We should not then be able to apply our greater stock of nuclear weapons and we might thus lose the initiative at the start. Our policy, to guard against this eventuality, should be to develop, as fast as possible, and to maintain in perfect working order "a highly effective global early-warning system, together with the best air defence the scientists can give us." This would, it is hoped, enable us to parry the blow.

(ii) If the war be delayed more than five years, the enemy "may have developed, for delivering their weapons with accuracy, both short-range and long-range means which do not rely on piloted aircraft." That threat would be very difficult to counter because the targets—whether launching sites or the weapons themselves in the air—would be much less vulnerable than piloted aircraft. What then, in those circumstances, should be the targets for our offensive air power? At least the enemy would be using piloted aircraft in support of his land and sea forces, and these, with their bases, would then, as now, be suitable targets for our aircraft and missiles.

Whatever form the war may take and whenever it comes (if it is to come) "we have got to win the war in the air." To ensure this, our air forces must regain their flexibility and unity; the air command must be organized accordingly; and "we must maintain in peace the ability to launch an immediate offensive in the air against anyone who attacks us." As "there is at present no sure defence against the aeroplane or ballistic rocket"; the scales are heavily weighted in favour of the air offensive, and the West is very vulnerable to nuclear attack. Therefore, the best scientific brains, in co-operation with the air forces, must speedily find a solution to this problem. For "great offensive power is wasted unless it is married to defensive power and can be launched from a secure base." Later on, as the offensive power of the two opposing sides is more or less equalized, "the advantage will go to the side which has the greater defensive strength, which can protect itself against attack *and can survive and strike back.*"

THE WAR AT SEA AND ON LAND

Turning next to the war at sea, Lord Montgomery emphasized the vital importance to the Western nations of sea communications. "No modern development," he said, "has lessened, or is likely to lessen in any foreseeable future, the dependence of the Western nations on the movement of their means of existence across the oceans of the world—in war, or indeed in peace." And he added that, in a war between East and West, the West could not win if it lost control of the Atlantic; for if we could not "deploy in Europe the power of the American continent, Europe could fall."

The maintenance of sea communications is, of course, the first task of our naval forces, but naval forces need air support. Whereas it might be possible for this air support to be provided by shore-based aircraft for navies operating only in narrow seas, "it is vital, *in the conditions of today*," the Field-Marshal asserted, "that navies called on to operate in the great oceans should have *their own air forces*." But he then proceeded to put the question: "In the future, will the seas be controlled from the sea or from the air?" adding that he himself believed that "the time will come when the major factor in the control of the seas will be air power." This is one of the revolutions in strategy which the present rapid developments in the range and power of aircraft may bring about, and it is one which calls for the most serious attention of all those who are concerned with the defence of the West.

Besides the need for a fresh study of the strategy and tactics of land warfare in the light of the new weapons that are now becoming available, the extended use of air forces in support of our armies also calls for deep consideration. Lord Montgomery suggested several ways in which the armies of the immediate future could immeasurably increase their mobility and striking power by a wise employment of air support, and indeed, he said, this would have to be done. "We need," he explained, "divisions that can be moved rapidly by air," and "armies need a simple line of supply based on an air lift" which can be maintained by day and by night in all weathers. V.T.O. aircraft capable of high speed in level flight would be necessary for the lift between base depots and the forward maintenance areas; while the base depots should be replenished by large air freighters.

Whether these air-lift aircraft should belong to the Army or the Air Force may be a controversial question for some time to come, but it calls for immediate examination at the highest level. Lord Montgomery favoured control by the Air Force for several reasons: (i) "No nation could afford to give to *one* Service the amount of air lift that Service would need at any particular peak moment in the war"; (ii) "great flexibility will be needed in war time—the ability to effect rapidly a large concentration of air lift within a theatre of war will be necessary"; (iii) "great skill will be needed if the lift is to be maintained in all weathers"; (iv) "air cover and protection will be necessary"; and (v) "an air lift organization must be dovetailed into air operations." Furthermore, we may venture to add, local air superiority will be essential.

PEACE-TIME PREPARATIONS

So long as there is no absolute defence against air attack, it will be necessary to build up and maintain, in peace time, a strong counter-offensive potential, i.e., "the means with which to hit back instantly and to give more than you receive." This should be a powerful and, we hope, effective deterrent against aggression. But it can be done only by maintaining, in peace, an air striking force of sufficient strength ready for immediate action—a force that does not depend on reserves and on the carrying out of mobilization procedures before it can come into action.

R. F. P.

LETTERS TO THE EDITOR

DEAR SIR,

To those of us in the R.A.F. who have served in close contact with the Royal Navy for many years, and who go to some trouble to "see the naval point of view," and in so doing at times almost lean over backwards, it is extremely irritating to find articles written by Admirals which are entirely spoilt by their partisan attitude in approaching problems in which air and sea power are jointly concerned. It would be much to the benefit of our two Services if the problems which confront us were approached in an entirely non-partisan attitude.

Admiral Horan, in dealing with the weather factor in his article on "Control of Sea Communications in a Future War," states that "again one can well imagine conditions when the convoy is steaming in good conditions and when shore-based aircraft, which ought to have formed part of the escort, were grounded" and later on he says that "the sea forces must have at their disposal the ships and sea-borne aircraft in sufficient numbers to provide really efficient escorts. In this respect the provision of escort carriers seems to be a controlling factor." Admiral Horan omits to say that one can equally well imagine conditions when the convoy is steaming in very bad weather when the carrier-borne aircraft may not be able to operate, or alternatively the carrier has been damaged. Furthermore, the carrier might well be required elsewhere to reinforce a dangerous situation. Thus it is idle to put the emphasis too far the wrong way. I would suggest that the proper answer is to say that both carrier-borne and shore-based aircraft are necessary for these operations and that they are, in fact, complementary to one another rather than rivals. I can well recall occasions, both during the last war and since during exercises, when the weather conditions in the North Atlantic and elsewhere have been such as to prevent the operation of carrier-borne aircraft, and an analysis of weather conditions shows that escort-carrier operations may be limited to about 80 per cent of the time at sea. There is no comparable limiting weather factor which would prevent aircraft taking off from coastal bases and proceeding to their patrol areas, but I readily admit that there may well be days when aircraft cannot return to a specific base; it is reasonable to assume, however, that there will be at least one base within range of the aircraft to which they can return. The arguments for and against escort-carrier and shore-based aircraft are nicely balanced, but no one could deny but that the shore-based aircraft, by virtue of its greater offensive capability and navigation ability, is operationally a better A./S. aircraft for the job than its carrier-borne brother.

Admiral Horan also touches on the question of "certain immutable principles" which are concerned with the maritime war at sea and quotes examples from the last war. Personally I have always been confused by certain naval terms and phraseology, and this appears to me to stem from a confusion of abstract terms with concrete factors which themselves originated in or about 1912, when the naval staff officer class was created. The great admirals of the Revolutionary and Napoleonic era never talked about "Lines of sea communication," "Zones of control," "Shipping lanes," when stating the aim of naval strategy. These terms were borrowed direct from tenets of military strategy, a very different thing. These great admirals saw to it that all convoys in their commands were escorted, and not until that was provided for did they "seek the enemy," and "seek to destroy," "attack at source" and so on. Nelson's continual cry for frigates when he was C.-in-C., Mediterranean, was not for his own death-or-glory purposes, but because he realized that the supply convoys under his charge were so inadequately escorted. It is ships that the enemy is trying to sink and observing that lines of communication have no real meaning at sea, where vessels can vary their route widely at will and where there are no rails to tear up in front of or behind them, no roads to cut, canals to block or bridges to destroy, I suggest it is misleading to use these terms.

The true nature of events was far better expressed in the time-honoured words of the first naval prayer, dated 1662: ". . . that we may be a safeguard and security for such as pass on the seas upon their lawful occasions . . ." followed up in the first printed King's Regulations and Admiralty Instructions dated 1731, where it said that the first duty is towards convoys and their safe and timely arrival. All this seems to have been lost sight of with nearly fatal results to us at times and it seems once again that there is a danger of present naval thinking falling into the same dangers in favour of the specious snares of "attack at source."

Let us, therefore, work on the basis that modern war at sea has become a joint responsibility of navies and air forces—and that this principle should be reflected in the thinking, organization and system of control of navies and air forces in this century.

Yours sincerely,

EDWARD CHILTON,
Air Vice-Marshal.

DEAR SIR.

In July, 1953, you were kind enough to print our appeal for information regarding the history of Royal Air Force, Biggin Hill. Your readers may now be interested to hear that a great deal of valuable material has been sent to us and it is hoped to complete the history during 1955. Further contributions would greatly assist us in this task and would be gratefully received.

In the meantime a short history has been compiled to commemorate last year's anniversary of the Battle of Britain. This tells the story of the station from its foundation in 1917 to the present day and has been printed in the form of an illustrated brochure. This was sold in aid of the Royal Air Force Benevolent Fund on Battle of Britain day. Copies may be obtained from the Station Commander by post, price 1s. each.

Yours faithfully,

T. A. LYCETT,
Flying Officer,
for Officer Commanding
Royal Air Force, Biggin Hill, Kent.

ROYAL AUSTRALIAN AIR FORCE

OPERATION "FRIGID FLUTTER"

(Digest from the narrative and diary of Flight Lieutenant D. W. Leckie, R.A.A.F., Officer Commanding the R.A.A.F. Antarctic Flight with the Australian National Antarctic Research Expedition, 1954.)—A.H.S.

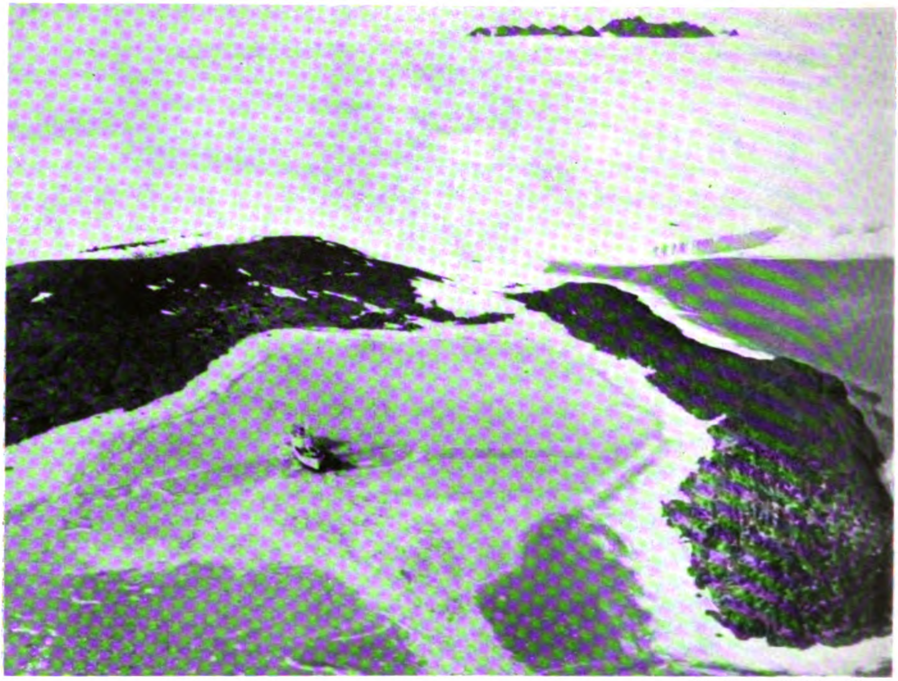
[*Antarctic Division Photo*

Mr. P. G. Law, leader of the Australian National Research Expedition, who is head of the Antarctic Division of the Department of External Affairs

WHEN the full story of this expedition is written, another page will be added to the history of the Royal Australian Air Force's association with polar exploration. In this brief article it is only possible to recount the merest outline of the adventures of the four members of the R.A.A.F., who were the "eyes" of this expedition, undertaking hazardous flying over the icy wastes of Antarctica, to enable Australia's first permanent base to be established on this vast continent, lying almost wholly within the Antarctic Circle, with an area of some six million square miles.

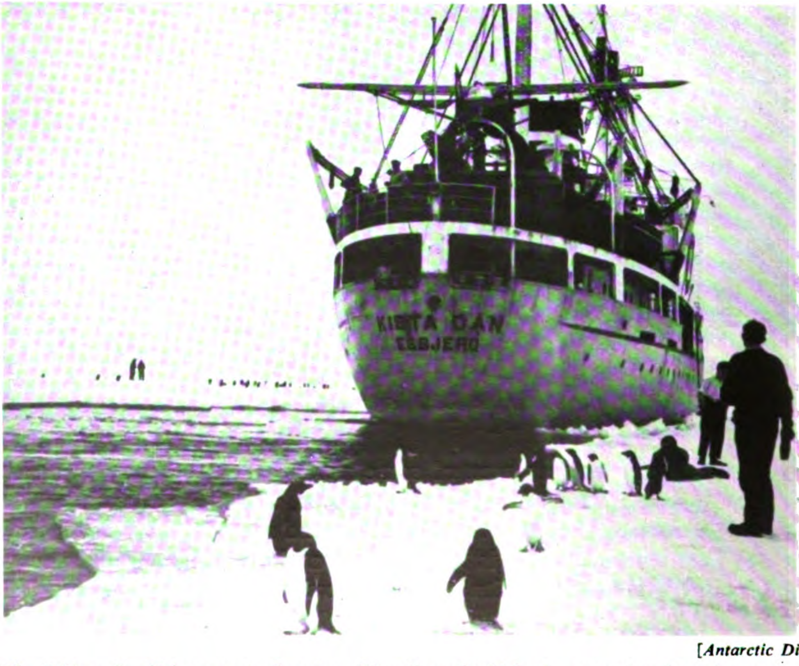
Whereas the Arctic is comparatively well-known, and the North Pole area is frozen sea, the Antarctic is still an unknown land mass of which less than one-tenth has been surveyed and is known to contain mountain ranges of at least 15,000 ft. Little is known of its mineral resources apart from its deposits of coal.

Average temperatures here are lower than those of the Arctic. Animal life and vegetation exist within the Arctic Circle, but in the south polar regions the only vegetation consists of occasional patches of moss and lichen on



[Antarctic Division Photo

The "Kista Dan" at ice anchorage in Mawson Harbour, David and Casey ranges tower from ice plateau in the background. R.A.A.F. aircraft operated from ice around the ship



[Antarctic Division Photo

The "Kista Dan" hove to in fast ice, 20 miles of which she was ploughing her way through to Mawson Harbour. Penguins enjoyed swimming in the only water for many miles: that in the wake of the ship exposed rock surfaces. On the outer fringe of the pack ice which skirts Antarctica, seals and penguins are a source of food for the explorer; inland, man must carry his own food or perish.

On still days a mantle of brooding silence is cast over a landscape of colour and grandeur. With nature in angry mood, winds exceeding Force 12 are commonplace and frequent blizzards reduce visibility to a few yards.

The Antarctic Flight was equipped with two Auster aircraft capable of being fitted with floats or skis, to enable landing on land, sea or ice, with special modifications to strengthen them for gruelling operating conditions. They carried many extras, including full instrument panels. Point Cook, because of its seaplane slipway into the waters of Port Phillip Bay, was chosen as the base for the Antarctic Flight, and it was here that we gained practice in operating the Auster as a float plane.

Another important aspect of our training was familiarization with snow conditions. Although Australia has snowfields larger than those of Switzerland, and thousands of ski-ing enthusiasts flock there every winter, the average Australian is more at home in the surf than in the snow. Together with other members of the expedition we were given ski-ing lessons at Mount Hotham, a Victorian winter sports resort.

Sergeant Seaver* and I carried out a survival exercise in which we camped out in the snow and tested the survival kits which we carried in the Austers. After we pitched our tent and laid out our sleeping bags, we prepared our first meal of the type of rations we would encounter if forced down in Antarctica. It was our first introduction to pemmican—the dried meat of the Eskimo and the polar explorer. We boiled up some pemmican with some spiced powdered onion, using our small primus stove.

We cannot say, truthfully, that we enjoyed our pemmican. The fact that it was rather old and had been around a bit probably did not improve its flavour. It was some that, in the late 30's, had been left by Sir Hubert Wilkins in an old camp in Antarctica, and had been salvaged by a later expedition in a test of its keeping properties. However, we did enjoy a Camel cigarette which was more than twenty years old and had been the subject of a similar experiment.

Neither Seaver nor I had ever flown ski-equipped aircraft and it was not possible to include this aspect of airmanship in our snow preparations. Our theories on taking-off and landing on skis on ice proved sound, however, and we had no difficulty in quickly mastering the technique when we began our flying operations in Antarctica.

I must admit, however, that we and all members of the expedition who flew with us have vivid memories of the terrific clatter and vibration experienced when landing on the rough, knobbly, wind-swept ice of our "airfield" at Mawson. (Our incidence of broken tailskids was very high as a result of the battering they received.)

On 4th January, 1954, we sailed from Melbourne in the polar expedition ship *Kista Dan*, and we took our share of the messing and other chores on board as we steamed south. For the first three days the weather was fair, but from then onwards the sea became rougher. Fifteen days after sailing we arrived at Heard Island, and was Sergeant Morgan (our airframe carpenter) glad, as he is obviously not provided with a sailor's stomach. Here rough seas and snowstorms interfered considerably with loading and unloading. Thirty "Huskies" were taken on board, as well as numerous boxes of bad seal meat for them.

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* A young pilot who had flown 101 operations in Korea.

The smell was overpowering and it was several weeks before we became accustomed to it.

On 22nd January, we dropped anchor in the harbour of Port-aux-Francais. the French base at Kergvelen Island, and during our stay were entertained lavishly with good food and excellent wine. When we sailed on the 27th January, our hosts gave us a farewell salute by firing three plugs of dynamite. The R.A.A.F. acknowledged this with three Very cartridges, most suitable salutes for the occasion. It was calm sailing down to the pack-ice where, on 31st January, we sighted our first icebergs. Here the presence of Antarctic petrels indicated to old hands that we were approaching the ice belt. With floats fitted to the Austers, our role was to carry out air reconnaissance to lead the *Kista Dan* through channels in the pack ice, until we reached the twenty-mile belt of fast ice which would then separate us from the proposed base on the mainland. On reaching this belt it meant changing to skis to operate from the fast ice, so that we could first help to guide the landed party over what appeared to be the best course across the ice to their base, and secondly to assist the captain in deciding the best course to follow in driving his ship through the ice to the shoreline and base. The landed party in three Weasels and two caravans were faced with crossing about seventeen miles of difficult ice before reaching the only rocky section of the coast that was known to be free from ice. Here the base was to be established.

On 2nd February the *Kista Dan* entered into a reasonably large pool of water and flying operations began. With Mr. Law as my passenger, after two unsuccessful runs, the water became sufficiently disturbed to enable us to take off, flying between half a dozen icebergs in the process. Climbing to 1,500 feet, south of us the four ranges of Henderson, Masson, David and Casey stood out clearly and, towards the coast, Mawson was easily recognizable. After examination of the terrain we relanded near the ship after 1 hour 35 minutes flying. The captain then took the *Kista Dan,* with help from Mr. Law, into a channel we had noticed running in a south-westerly direction into a large area of landwater where, as darkness fell, anthor was dropped for the night.

The next day, while the captain took his ship across the landwater and began the slow and tedious passage through twenty miles of fast ice (thirty inches thick) to Mawson Harbour, three flights were carried out to check the camp site and photograph the coast east and west from Mawson Harbour.

On 4th February I took Captain Peterson on a further reconnaissance of the harbour and all ice leads towards it, as well as a photographic run of the Henderson Range at 7.500 feet. Another flight was made to check up a secondary camp site near some penguin rookeries west of Mawson and over the most northerly islands to note the breaks in ice. Refuelling the aircraft by a long hose from the deck of the *Kista Dan* worked well, but the hundreds of inquisitive penguins round the ship were a nuisance when taking off and landing ; how we managed to miss the lot was a mystery. Working a sixteen-hour day in the extreme antarctic cold was a great strain, relieved later by other members of the expedition taking over some of our non-flying duties.

On 5th February the land party set off in three Weasels and two caravans on their journey across the seventeen miles of ice to Mawson Harbour. Although the day was perfect the Katabatic wind from the plateau was intense. Air support was given by flying a reconnaissance ahead of the party and, when they were in difficulties, landing beside them to advise alternative routes. Many difficulties were encountered and progress was so slow that at nightfall it was necessary to camp on the ice. One aircraft was pegged down in shelter at Mawson Harbour, the pilot returning in the second Auster to the ship.

From 6th to 7th February gale force winds and snow held up operations, but the following day fifteen sorties were flown with stores to Mawson, and rescue gear for a Weasel that had gone through a thin patch of ice, *en route* for the base, which the ground party finally reached on 9th February, while we were busily flying in more stores.

During this period anxiety was caused by pack ice driven under the *Kista Dan* listing the ship out of the water at a dangerous angle ; but after blasting, digging and transferring fuel to one side of the ship, she slid off the ice back into the water; in the meantime the ship had drifted five miles westwards on the pack ice.

On 10th February Captain Peterson was flown on a further reconnaissance, which enabled him to find a possible passage for the *Kista Dan* to proceed towards Mawson, but it was a hazardous trip and caused many anxious moments pushing through the ice until 11th February, when anchor was dropped in the harbour. The ship might easily have been lost if a storm had arisen, but the weather was reasonably kind until reaching Mawson, when the storm broke upon us. A full-scale gale gave us all a very rough time and despite every precaution both aircraft were damaged, apparently beyond repair. Yet by 16th February, by miracles of ingenuity, the ground staff of two made one serviceable Auster out of the wreckage. It looked like a patchwork quilt. The following day (without flaps) it was successfully flight tested. By manhandling this aircraft a mile and a half for each take-off, flying support was maintained until 22nd February, but weather conditions deteriorated and with the loss of Sergeant Duffell (engine fitter and crew chief) seriously injured in a fall, only two sorties per day were possible. Temperatures were down to 37° below freezing, but this did not prevent our covering 250 miles of coast-line; a vertical line overlap and mosaic of Mawson and surrounding islands for about 50 square miles as well as one of the four ranges.

On 23rd February we bade farewell to the party who were "wintering in the Antarctic," but this was by no means the end of our adventures and hardships. An account of these is not possible in so brief an article, and it would be more a story of the hazards from storms, icebergs and the dangers of the Antarctic seas than one of the air. We played our part nevertheless. When we finally reached Melbourne we were proud of the honour of having been chosen to uphold the traditions of the Royal Australian Air Force, in what must be the best equipped expedition ever to venture into the Australian sector of the Antarctic.

[National Defence Photo

A typical aerial survey oblique view of mountains between Cenol and Whitehorse.

ROYAL CANADIAN AIR FORCE

PHOTOGRAPHIC SURVEY

TODAY, two main types of photographic surveys are undertaken: vertical and tri-camera. In the former method a single camera is used and accurate large-scale maps are produced from the resulting photographs.

Tri-camera photography, in which three cameras on a single mount are operated simultaneously, produces a fan of three photographs, giving coverage from horizon to horizon, through the vertical. Accuracy is sacrificed for coverage, but this method is approximately six times as rapid as vertical photography. (As a matter of fact, with the precise calibration now used it is possible to produce accurate 8-miles-to-the-inch maps from tri-camera photographs, and, where there is little relief in the terrain, 4-miles-to-the-inch maps of reasonable accuracy.) All the National Topographic Series maps of northern Canada are being produced from tri-camera photographs.

When the aerial survey programme was started, only vertical photography was used. However, this was a slow process, and the speedier oblique photography was soon adopted. One camera, which would take a fan of three exposures, as close together as possible and covering a field of 180 degrees in front of the aircraft, was employed in this method. The plotting of these photographs was difficult and results were not too accurate, but many maps still in use were produced from such work.

The next step was to use three cameras, on a single mount, facing to the rear of the aircraft; and further developments led to the present-day tri-camera method.

Since 1945 the major part of the R.C.A.F.'s photographic survey programme has been carried out in the north. In 1948, when 911,500 square miles of northern Canada were photographed, operations were carried to the Arctic Islands for the first time. In that year all of Baffin Island was photographed, in addition to large areas of Labrador, Ungava, the North-west Territories, and the Yukon. Operations were continued in the Arctic Islands during the following year. Photographs were taken of Victoria Island, King William Island, and parts of Somerset Island, Banks Island, the Boothia Peninsula, further areas of the Yukon and North-West Territories, Labrador, Ungava, and northern British Columbia.

In the following years operations were expanded even further to result in what is now almost complete coverage of the whole of Canada by tri-camera photography. At the end of the 1953 season only 5,648 square miles (on North Ellesmere Island) remained to be covered.

The types of aircraft used during these years' operations were the Mitchell Canso, Norseman, Anson, Dakota, and Lancaster.

No. 408 Squadron (now the only photographic squadron) flies Lancaster X aircraft equipped with cameras for both vertical and tri-camera photography.

RE 1193-5. OSC INSTALLATION IN DAKOTA

[National Defence Photo

One of the aerial photographers is shown preparing for a flight.

In addition, several of the aircraft are equipped with special instruments and wiring, developed by the National Research Council, for Shoran-controlled photography. Shoran is a recent development in the survey field and was first proved in the 1950 operations. It involves the use of airborne radar equipment in conjunction with ground radar beacons spaced several hundred miles apart, and allows aerial photographs of the areas concerned to be positioned accurately.

The commitments for each season of aerial photography are decided by the Inter-departmental Committee on Air Surveys, and, as soon as the specific areas to be photographed have been determined, plans can be made. Bases are decided upon, and the flight lines are drawn up.

The timing of the detachments being sent into the various areas is a major factor in planning. Because of the short season in the north, it is now left to the R.C.A.F. to decide when operations in a particular area are carried on. In the past a great deal of good weather was lost by holding detachments in southern areas until a high priority commitment was completed. Now detachments work in the south only until photography is possible in the north. The detachments go into the field any time after the snow has gone from southern areas and the ice on lakes has started to break away from the shores. This usually means that the first detachment leaves Rockcliffe between 25th April and 1st May. A detachment generally makes four moves in a season; the first from Rockcliffe to a southern base, then to the northern base when the area opens, and back to a southern base before returning to Rockcliffe. The season is normally over by the middle of October, but special commitments are sometimes received which extend the season on into December.

Many of the earlier problems encountered by the photographic crews have now been eliminated, or solved, by the use of long-range aircraft and the availability of northern aerodromes. The problem that still retains its formidable nature, and which determines the area that can be covered in a season, is the weather. The retreating winter season is followed closely northward, and the work is done on the heels of the melting snow and ice. In some areas convection cloud forms as the land warms, and it is not unusual to find only a few days during the entire season suitable for photographic operations. To obtain coverage of these areas, the R.C.A.F. must be on the spot, ready to fly ten to fifteen hours a day while conditions remain good—a feat made possible by the nearly continuous daylight of the summer months.

The normal day on a photographic detachment starts at about 3 a.m., when the duty crew checks the final weather forecast and prepares to make a flight to check the actual weather. The first aircraft is usually off by 5 a.m., and, if clear conditions are found, the other aircraft are called by radio and take to the air.

On the average flight, the aircraft climbs gradually to approximately 10,000 feet and the flight in search of clear areas is continued at that altitude. Since many flights prove fruitless, a great deal of oxygen is conserved by flying at this height. This is an important factor, as three high-pressure bottles of oxygen are required to replenish an aircraft's system after approximately ten hours of use, and each of these bottles weighs 155 pounds. Any waste would soon cause a serious problem of re-supply, where all supplies must be airlifted.

When a clear area is sighted, altitude is increased to 20,000 feet and the crew makes final preparations for photographic flying. Cameras are given a short test run, the solar navigator (an adaptation of the astro compass) is set up, and the aircraft is trimmed carefully for straight and level flying.

[National Defence Photo

A section of one of the printing rooms at the Photo Establishment, where the aerial survey rolls are printed.

Once the area is reached, the navigator directs the pilot to the beginning of the first line to be attempted. The drift is checked carefully and the solar navigator started. Meanwhile the camera operator checks the interval and drift on his view-finder and levels the camera. As the start of the line is approached, the navigator gives the order to start the camera.

On the line the navigator is busy checking drift (every ten minutes at least) and making new settings on the solar navigator. In between times he is trying to pick up pin-points. and also attempting to sketch in on his flight-line map any details which may help on the next line. This latter operation takes a good deal of experience, and the degree to which a navigator can learn to sketch generally measures his success at flight-line flying in the north, where maps are most inaccurate.

Very accurate flying is necessary on the pilot's part, as he must maintain the required altitude within plus or minus 50 feet and hold an extremely accurate course.

One of the major problems in the north is the maintenance of direction. The best magnetic compass becomes erratic in higher latitudes, and the vacuum-driven gyros do not stand up very well. The solar navigator is used to direct the pilot for straight flying, and the astro compass to supply settings for the gyro instruments.

Another major problem is servicing the aircraft at the more isolated bases. No hangars or other permanent facilities are available at such places as Norman Wells, Yellowknife, or Coral Harbour, and the work must be done in the open —rain, snow or sun, as the case may be. Dust is another constant torment to the hard-worked groundcrew. In spite of the limited facilities remarkable records of serviceability are achieved.

Film exposed in the field by the photographic aircraft is shipped to No. 1 Photographic Establishment, at Rockcliffe, for processing. Possessing one of the world's finest and most modern aerial photographic laboratories, this establishment plays a vital part in the general photographic survey programme. After processing, the film is given an initial check for accuracy and quality, and each negative is numbered to allow instant identification. Possible gaps in the area covered, caused by camera failures or lack of forward overlap, are spotted at this stage.

The negatives are then printed and laid out in a mosaic, which shows if any lateral gaps exist as a result of errors in navigation. If there are any gaps, the detachment which flew the lines is notified, and prints of the mosaic are sent out to be used when the lines are reflown.

All negatives taken for the government are stored at No. 1 Photographic Establishment, while an index of them is held at the National Air Photographic Library of the Department of Mines and Technical Surveys. The R.C.A.F. is not responsible for map-making. The finished prints are turned over to the Department of Mines and Technical Surveys, or the Army Survey Establishment. for the compilation of maps.

By the end of the survey season of 1953, 2,522,720 square miles of vertical and 2,494,524 square miles of tri-camera photography had been completed by the R.C.A.F. That these figures add up to more than the accepted land mass of Canada is explained by the fact that vertical coverage duplicates the tri-camera, and some areas have been reflown at a different scale. As tri-camera photography of the north is now practically complete, future efforts will be concentrated on vertical photography for detailed mapping, and the completion of Shoran control.

SOUTH AFRICAN AIR FORCE

OPERATION "DURBEX"

SINCE 1951 an annual exercise has been held in Durban, to provide realistic practice for the maritime forces in South African waters. For this purpose a Royal Naval submarine has come from the Mediterranean each year to act as target for the ships and aircraft whose role it will be to protect our coast line in time of war. "Durbex" is the code name which has been given to these exercises.

Starting from rather humble beginnings, the exercise has grown, both as regards the forces taking part and in the scope of the practices carried out. In 1954 the C.-in-C., South Atlantic, had under his command two ships of the Royal Navy, three of the South African Navy, a French ship, and the submarine H.M.S. *Tudor*. The Officer Commanding, 2 Group, S.A.A.F., co-ordinated the exercise for Nos. 35, 17 and 22 Squadrons of the S.A. Air Force, three Shackleton aircraft from No. 37 Royal Air Force Squadron based at Malta, and four Dassault and two Sunderland aircraft of the French Air Force, which came from Madagascar and Dakar respectively, especially for the exercise. This year, too, the exercise took place at a range of up to two hundred miles out to sea, which made practice far more realistic, especially from the air point of view. Previously the area of operation had been restricted to that within a fifty-mile arc to seaward from Durban.

Another innovation this year was the operation of all landplanes from Durban's new national airport—Reunion. Because no airport buildings have been completed yet, a "canvas" camp was erected to provide protection for personnel on duty. Appropriately, this camp was called "Camp Willmott," for Brigadier Willmott, who is to retire soon from the post of Air Chief of Staff, was in Durban for the exercises, and spent a considerable amount of time watching the operations from Reunion.

Before the exercise began, news was received that a R.A.F. Dakota, bringing the spares for the Shackleton aircraft, had crashed at Nairobi. All on board lost their lives, and all the spares were destroyed. True to tradition, however, the R.A.F. crews did not let this tragedy mar the exercise and carried on despite the difficulties and personal feelings. The story which best illustrates the spirit of this Squadron and the excellence of the Shackleton aircraft was of the crew who completed a successful exercise lasting four hours despite the fact that an engine gave trouble just after take-off and had to be "feathered." The performance on the remaining three engines was truly remarkable.

To retain realism, the submarine had to be given time to travel to a new exercise area after each encounter. During these periods the ships were fully employed carrying out practices such as evolutions, tactical manœuvres, passing stores at sea, depth charge, torpedo, gunnery and anti-aircraft firing,

[South African Air Force Photo

Brigadier Willmott, Air Chief-of-Staff, South African Air Force, with Royal Air Force Shackleton crew at Reunion Airport

night encounters and defence against air attacks. For the latter exercise, the French Dassault aircraft made very realistic attacks on the fleet, while S.A.A.F. Venturas acted in the unaccustomed role of fighters under the direction of H.M.S. *Euryalus*. While the submarine was in transit she was continually tracked by aircraft, or perhaps it would be more accurate to say that aircraft attempted to track her. At the appointed time, which was known only to the Controllers of the exercise, the ships and the submarine would again be within striking distance of each other. At this stage the combined air/sea anti-submarine exercises would begin again. Thus it went on from Sunday evening until midday on Friday—there was very little sleep for those concerned during that period.

The Combined Headquarters of Coastal Command and 2 Group S.A.A.F., which is permanently established at Youngsfield, Cape Town, virtually moved to Durban for the exercise, and a Maritime Headquarters was set at Salisbury Island. This was the "heart" of the exercise from the air point of view, but Vice-Admiral I. M. R. Campbell controlled the naval side from his flagship afloat—H.M.S. *Euryalus*. The Maritime Headquarters was "awake" night and day, manned by naval and Air Force staffs, to issue the orders for patrols and the intelligence information which made the narrative " hang together," or to receive back reports from the aircraft regarding the success of the missions or statements of the serviceability and availability of aircraft. The naval staff dispatched signals to let the ships know the current air situation and maintained a plot of the surface ships and of the submarine movements. At all hours the signals staff, who were situated in the same building, were frantically busy, and each message they brought called some alteration to the " plot " or to the aircraft stateboard, and almost inevitably some answering signals with new instructions had to be dispatched. A more detailed account of the activities in the Maritime Headquarters would not be of interest, so suffice it to say that the jaded staff thought back longingly to the war-time days when Operations Rooms were adequately staffed and Wrens and Waafs were available to do the more routine tasks.

At the two air stations involved, Reunion Airport and the flying-boat base, Air Force Station Congella, the Operations Rooms were equally busy. Here the orders and intelligence information received from Maritime Headquarters were consolidated for aircrew briefing, and the results of sorties were compiled into reports to be signalled back. This, too, went on day and night, punctuated by cups of coffee and sandwich meals.

For the aircrews there were many hours in the air and even more on stand-by. Thanks to exceptionally good serviceability of aircraft, particularly in the S.A.A.F. Squadrons, it was possible to take maximum advantage of the presence of a target submarine. The fact that the submarine was sighted on nine occasions by aircraft gives some idea of the value of the exercise to the Squadrons taking part, and gives some cause for satisfaction, too.

In the ships at sea, life followed the pattern which it would have to conform to in modern war. Ships' companies were at action stations most of the time, and those particularly concerned—e.g., radar, asdic, plot, and communication ratings—had little respite. The element of discomfort inseparable from a warship at war was introduced. The ships were completely blacked out during the dark hours, and meals frequently consisted of sandwiches and cocoa at each man's action station. Commanding Officers in particular were reminded of the strenuous nature of their responsibilities in war time.

No story of "Durbex" could be written without a note of appreciation for the part played by Lieutenant Commander R. A. Hedgecock and the crew of the submarine, H.M.S. *Tudor*. For them it was a tedious week under most uncomfortable conditions. They, however, kept on the job and did not spare themselves to give us the full benefit of their presence. Though a seaman became seriously ill on board soon after the exercise began, they carried on regardless in true naval tradition.

To bring home the lessons, a joint de-briefing was held on the Friday afternoon. Candid constructive criticism was the order of the day, and in a most friendly though serious atmosphere, the exercises were discussed and the shortcomings laid bare. Thus a most profitable five days was brought to a happy conclusion, and those present left the de-briefing with many notes which will give rise to bigger and better " Durbex " exercises in the future.

In case the impression has been gained that " Durbex " was all work and no play, it must be recorded that some most successful inter-service functions were held both before and after the exercises. The Mayor of Durban, too, gave civic receptions to welcome the city's guests as only Durban can. Scenes at Air Force Station Congella brought back nostalgic memories to those who remembered the crowded war-time camp. The flags of three nations —the Union Jack, the French flag and our own Union flag—formed part of the decorations at the cocktail party at Congella, and signified the united nations atmosphere which prevailed there. Those who were not forced to leave for their home bases on the Saturday attended the Durban July Handicap race meeting. Even those who did not pick the winner that afternoon will agree that a suitable comment on this year's "Durbex" would be " C'est-si-bon "!

CONCERNING PERSONNEL

NEW APPOINTMENTS

Among the promotions and appointments of Royal Air Force personnel announced by the Air Ministry since the publication of the Autumn Number of AIR POWER, are the following:

AIR MINISTRY

Air Vice-Marshal Walter John Seward, C.B., C.B.E. (retired), has taken up the post of Director, Auxiliaries, Reserves and Air Cadets, in the Department of the Air Council Member for Personnel at the Air Ministry, succeeding Air Vice-Marshal W. M. Yool, C.B., C.B.E. (retired).

Air Commodore M. S. Shapcott, who has been Air Officer Commanding No. 206 Group, Middle East Air Force, since May, 1952, became Director of Engineering (B) at the Air Ministry in December.

Air Commodore H. J. G. E. Proud, C.B.E., has been appointed to Air Ministry as Provost Marshal; he was succeeded in his post of Air Officer Commanding, No. 67 (Northern Ireland) Group, and Senior Air Force Officer in Northern Ireland, by Air Commodore G. W. Hayes, O.B.E., Director of Manning, Air Ministry. Group Captain F. A. Pearce, C.B.E., of the Directing Staff of the Royal Air Force Staff College, Bracknell, is the new Director of Manning in the rank of Air Commodore.

HOME COMMAND APPOINTMENTS

Air Commodore H. I. Cozens, C.B., A.F.C., has taken up the appointment of Air Officer in charge of Administration, Headquarters, Home Command, after having been Deputy Assistant Chief of Staff, Air Training, at Supreme Headquarters, Allied Powers, Europe, since April, 1951.

Group Captain Michael Harington Dwyer, who was Senior Air Staff Officer, No. 1 Group, R.A.F. Bomber Command, is now Air Officer Commanding, No. 62 Group, R.A.F. Home Command, with the acting rank of Air Commodore.

NEW AIR OFFICER COMMANDING, IRAQ

Air Vice-Marshal H. H. Brookes, C.B., C.B.E., D.F.C., has taken up the appointment of Air Officer Commanding, Iraq.

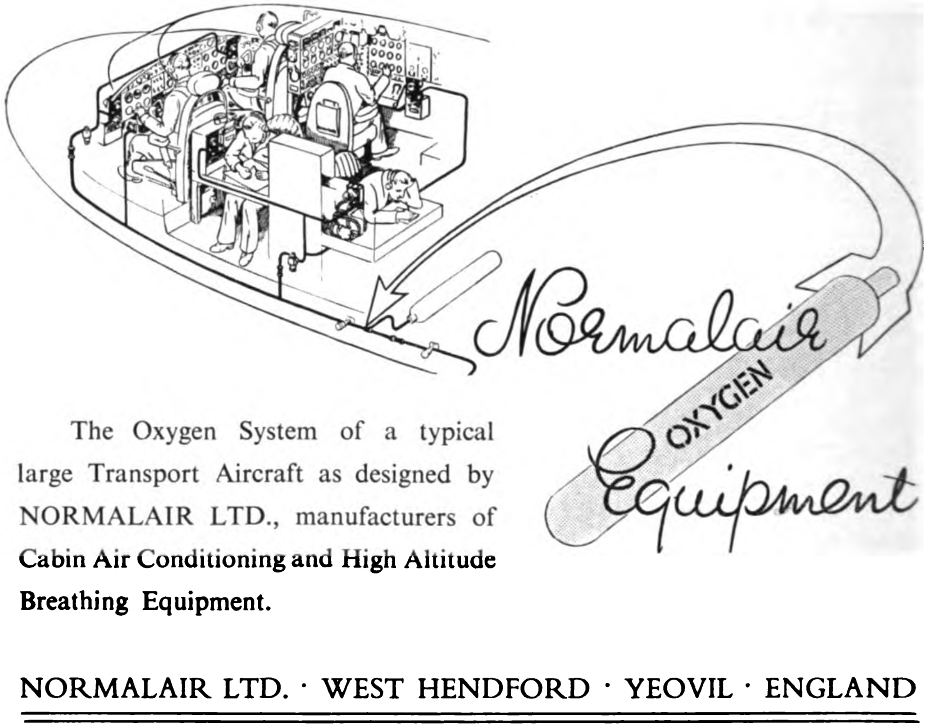
MIDDLE EAST AIR FORCE

Air Vice-Marshal P. S. Blockey, C.B.E., appointed Senior Technical Staff Officer, Headquarters, Middle East Air Force.

R.A.F. OFFICERS FOR IMPERIAL DEFENCE COLLEGE

The following Royal Air Force officers have been selected to attend the 1955 course at the Imperial Defence College: Air Commodore H. R. Graham, D.S.O., D.F.C.; Air Commodore J. D. Miller, C.B.E.; Air Commodore S. Widdows, D.F.C.; Group Captain J. G. Davies, C.B., O.B.E.; Group Captain O. R. Donaldson, C.B.E., D.S.O., D.F.C.; Group Captain S. W. R. Hughes, O.B.E., A.F.C.; Group Captain B. J. R. Roberts; Group Captain F. S. Stapleton, D.S.O., D.F.C.; Group Captain C. J. Salmon, O.B.E.

Five members of Commonwealth Air Forces will also attend the 1955 course.



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BOOK REVIEWS

Royal Air Force, 1939-1945. Volume III—"The Fight is Won." By Hilary St. G Saunders. (Her Majesty's Stationery Office. 441 pp. Illustrated. 13s. 6d.)

In this third and final volume of the officially commissioned history of Royal Air Force operations in World War II we are given a terrifying picture of the might of modern air power. Gone are the near-chivalrous man-to-man aerial combat of the Battle of Britain and the first unspectacular attempts by Bomber Command to strike back at the German war machine.

Instead, we see the *Wehrmacht's* toughest soldiers slaughtered in thousands and the survivors reduced to a dazed, helpless, hopeless rabble by "cab ranks" of rocket-firing Typhoons in Normandy. Far behind the lines, whole German cities are swept by indescribably terrible fire-storms kindled by the high-explosive and incendiary bombs of Harris's great force of Lancasters and Halifaxes. At sea, the last hopes of German victory fade as Coastal Command, in co-operation with the Royal Navy and its Allies, gains final mastery over the U-boats. In far-off Burma, armies march to victory, maintained solely by air supply. And the story reaches a climax of unprecedented terror and power when two Japanese cities and tens of thousands of their inhabitants are obliterated by just two bombs.

This is air power as even Douhet could not have foreseen it—all-conquering; not replacing land and sea forces, but dominating them.

Inevitably in so small a book, the story is rather impersonal, a thing of cold facts and figures. But this may not be a bad thing, as the main narrative is unclouded with detail, and there have been plenty of fine personal stories of the human courage, sacrifice and achievement that made it all possible. The only serious omission is that Mr. Saunders makes no reference to perfection by the Germans of the R4M air-to-air rocket, used in conjunction with the Ez. 42 gun-sight on specially "hotted-up" Me.262 twin-jet fighters in April, 1945. This is as puzzling as the R.A.F.'s failure to develop the weapon after the war, and one wonders whether the two mysteries might not be interconnected.

History, as a mere record of the past, is interesting, but of little real value. It is profitable only when it teaches us lessons for the future; and we can learn plenty from this book.

In the attacks on flying bomb launching sites, for example, we see that Fortresses had to drop 165.4 tons of bombs to destroy one site, Mitchells 219 tons, and Mosquitoes only 39.8 tons. A bridge could be destroyed with 100-200 tons of bombs by fighter-bombers, compared with 640 tons if "heavies" were used. There could be no better argument for the use of small, very fast, highly-manœuvrable ground-attack aircraft.

Similarly, we are left in no doubt of the value of mine-laying aircraft. Mines laid by the Royal Air Force alone sank 759 German vessels of all types, totalling 721,977 tons, in N.W. European waters, and damaged a further 130 vessels of some 426,000 tons.

The immense importance of photo-reconnaissance is shown over and over again, not least in keeping track of preparations for the V1 and V2 offensive against England. And we read how the commander of *Flak* Regiment 155W, which launched the V1 flying bombs, was so fearful of the presence of Allied agents and spies, delivered to France by the Royal Air Force, that he changed his name, sometimes put on a false beard and, during one move, changed his uniform several times while driving round Paris in a taxi, to foil imaginary assassins.

The agents themselves were certainly not imaginary. Indeed, the R.A.F. and its Allies dropped or landed 6,700 persons of eighteen nationalities in Europe between 1942 and 1945, and delivered 42,800 tons of supplies to resistance forces. Then there were the "blackmail" operations, one of which was so successful that French railway engine drivers destroyed more locomotives than did Allied fighters in the period preceding D Day, in return for a promise that their locomotives would not be attacked.

No branch of the Service is overlooked. Air-Sea Rescue forces, the little Auster "spotting" planes, airfield construction "commandos" and ground crews all receive well-deserved attention. And there is a special word of praise for the pilots who, as a method of "resting" between tours of operations, volunteered for the invaluable but extremely hazardous job of directing our fighters by radio in attacks on Japanese front-line positions in Burma.

The section describing the campaign in Burma is, in fact, one of the most readable and impressive in the book. Probably few people remember that 356,000 troops were kept supplied with all their requirements during the advance in 1945 solely by transport

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aircraft. And it is equally surprising to learn that 110,761 wounded were evacuated by air from front-line positions.

These, and other, tremendous achievements cost the lives of 70,253 men of the Royal Air Force killed and missing on operations in six years of war. Their colleagues who survived now see their old enemies welcomed as convenient allies, so that the great victory over cruel and evil men seems almost a mockery. Yet the greatest victory is, perhaps, that the fear of atomic age air attack alone is keeping the peace now in a troubled world. J. W. R. T.

Return from Hell. By Jules Roy, D.F.C. (William Kimber & Co. Ltd., 46 Wilton Place, London, S.W.1. 229 pp. Illustrated. 15s.)

This is the sort of book that one should read as a complement to the official R.A.F. war history. Jules Roy was the captain—but not the pilot—of a Halifax in a Free French squadron at the height of Bomber Command's offensive. Stationed at Elvington in Yorkshire, he took part in 37 operations, winning the D.F.C. and the Legion d'Honneur.

On his first mission, one of the other aircraft of his squadron collided with his Halifax, crashed and burst into flames. His own machine swayed terribly, an engine caught fire and set up such strong vibrations that he ordered the crew to jump, staying behind himself with the pilot to make a successful landing. After that, on every flight, and during almost every minute of the day and night, he seems to have been obsessed with the fear of another collision.

The reader sweats with him as the bomber stream crosses the English coast in the dark, bound for Germany, and the navigation lights begin to die out one by one. Even the flak over the Ruhr often seems less menacing than the vague black shapes of Halifaxes and Lancasters that occasionally loom up out of the darkness, glide past and leave the night sky once more filled with foreboding.

Not that *Return from Hell* is entirely without humour or colour. On the contrary, Jules Roy views England and the English through very observant Gallic eyes and the result is an occasional paragraph or two of rare beauty. He finds time to glory in a golden sunset, to feed and observe wasps that fly in through his open window, and to compare with amusement, envy and understanding the forced gaiety and luxury of a U.S.A.A.F. base with his own more sombre station.

This book is too introspective to appeal to most aircrews. But for those who watched and waited in England during those grim, glorious years, it gives a more realistic picture of what it meant to complete a tour of 37 bomber operations than any other book that has yet appeared. J. W. R. T.

The Dangerous Skies. By Air Commodore A. E. Clouston, D.S.O., D.F.C., A.F.C. and Bar. (Cassell & Co. Ltd., 37 St. Andrew's Hill, London, E.C.4. 187 pp. Illustrated. 13s. 6d.)

We often hear the expression "conquest of the air" applied to the history of aviation over the past fifty years. Yet the air has not been conquered, and never will be, as we are reminded periodically when aeroplanes are broken up in flight by unseen, immensely strong air gusts and shock-waves.

The original pioneers of flying did not have to worry about such things; and it was left to a second generation of pioneers to prove the practicability of the aeroplane for flight in all weathers, over long distances in any part of the world. Among them, was A. E. Clouston, who was one of the first two civilian test pilots appointed to the R.A.E., Farnborough, in 1935.

The story of his experiences is far more exciting than the average Hollywood aviation "epic." Take, for example, the time when he had to do speed trials with a Miles research aircraft, fitted with interchangeable thin, medium and thick wings. On one test flight he ran into bumpy weather, which tossed the machine around with such violence that he decided to turn back. When he landed, the port wing dragged along the ground, with the main spar broken in two.

Then followed research into icing conditions, during which he flew a modified Heyford bomber into the heart of black, turbulent thunder clouds. He found that the aircraft could be kept flying until a depth of just over two inches of ice had built up all over the wings, struts, wires and propellers. "Then, shuddering and vibrating under the load, she would begin to labour heavily, losing speed and height, notwithstanding the fact that the engines were running at full power boost. Like a lumbering, soggy, box-kite, the Heyford would sink to earth, still under control, although it would no longer stay in the air. As it lost height, so the ice would thaw, the aircraft would regain lift and climb back into the cloud for a further test."

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"Dangerous Skies" indeed: but Clouston had been brought up on danger. Before going to Farnborough he had helped to pioneer tied-together squadron aerobatics at the Hendon display, flying a Hawker Fury of No. 25 Squadron. But some of his later work at R.A.E. was even more hazardous.

From flying into ice he turned to flying into wire, to prove the effectiveness of barrage balloons for defence against bombers. The object was to see what happened when a Fairey P4/34 monoplane flew into wires suspended from parachutes, and he soon found out! On one occasion, the wire whipped around the fuselage, cutting a four-foot gash just behind his head. On another it got tangled up with an aileron, the aircraft went into a flat spin, and it took all his strength to regain control and bring it in to a safe landing. Sometimes the wing was cut through to the main spar. Other times, the trailing wire tore down electricity cables and caught up with a bicycle stand which it dragged along, leaving a trail of bicycles across the airfield.

Then there were Clouston's famous record flights, which yielded valuable research reports as well as prizes; and war-time experiments with photo-flash guns to light up enemy bombers, and explosive-filled motor-boats, radio-controlled from a Spitfire and intended to sink the *Scharnhorst* and *Gneisenau* at Brest. Finally, we see Clouston back in uniform, attacking U-boats with Coastal Command, before commanding his own station, then moving over to the Continent and, post-war, becoming Commandant of the Empire Test Pilots' School.

There can be few serving officers of the Royal Air Force with a more varied flying career, and certainly no other who has turned down an offer of a million pounds to do a single job, even if it did involve liquidating Hitler! J. W. R. T.

Development of the Guided Missile. By Kenneth W. Gatland, F.R.A.S. (Iliffe & Son Ltd., Dorset House, Stamford Street, London, S.E.1. 292 pp. Fully illustrated. 15s.)

Since the original edition of this book was published in 1952, guided missiles have progressed in the United States from the experimental stage to fully-operational weapons. Two squadrons of Matador pilotless bombers are stationed in Germany. Rings of Nike guided anti-aircraft rockets are protecting key target centres in America. The U.S. Army has Honest John and Corporal artillery rockets and the U.S. Navy has its first ship-borne missiles.

In England the Ministry of Supply has released a few details of early British experimental missiles. Russia, as always, remains an enigma. Yet the author of this book has been able to sift carefully all the grains of information and present a first-class, well-balanced picture of rocket progress throughout the world.

No other book on the market covers the subject so fully, or so accurately. Indeed it is extremely doubtful if any single scrap of reliable data has been omitted. Certainly the tables at the back of the book list data on every important rocket yet built—a total of 140 from eight countries, backed up by photographs, to scale, of 40 of them.

There are chapters on methods of propulsion; research and development; air-to-air, air-to-ground and artillery missiles; rockets for high-altitude research and even space satellites and interplanetary flight. The result is a book that cannot be ignored by any student of modern air power, any more than guided missiles themselves can be ignored in our current defence planning. J. W. R. T.

Minerals—A Key to Soviet Power. By Dmitri B. Shimkin. (Harvard University Press (London: Geoffrey Cumberlege). 452 pp., 8 maps and 101 tables. 63s.)

Dr. Shimkin's erudite and comprehensive *Minerals—A Key to Soviet Power* will doubtless leave many readers, not least those who have made a close study of Soviet minerals economics, with a strong feeling of the gross inadequacy of their own previous thinking on this extremely important subject. Frank—he is never ashamed to admit that he is making a guess—forceful, clear and admirably brief on even the most technical matters, Dr. Shimkin has written a book of absorbing interest to economist and strategist alike. The student of air strategy, in particular, will find in this book much that demands his attention, but he must not be surprised if he discovers that he has to revise many of his estimates of Russian short- and long-term capabilities.

No one would seriously deny Dr. Shimkin's main contention that a study of mineral industries provides a pointer not only to the broad economic policy of modern states but also to their intentions in the sphere of power politics. The author, however, makes no bones about the difficulties that face the mineral economist who tries to make sense of Soviet data. On the other hand, he does believe, even when data are fragmentary, that it is possible to make useful deductions on industrial trends. He scrupulously

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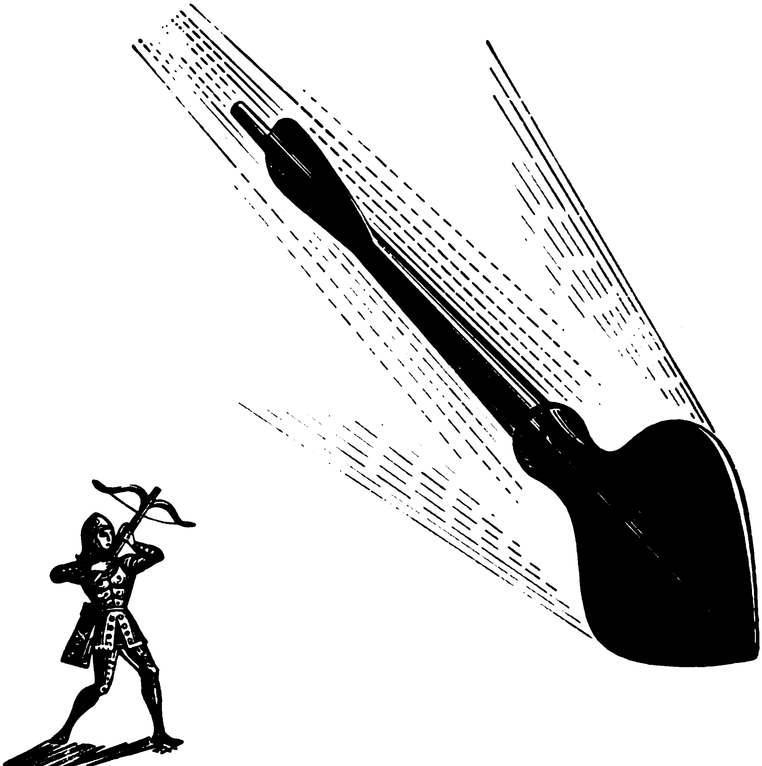
refrains from speculation and plainly admits the most probable sources of error in his materials and in his calculations. A major trap for the unwary, as he indicates, is the lack of precise definition of products in Soviet output statistics, from which "truly majestic errors" can result.

It is only possible here to give a very broad picture of this book. From the standpoint of mineral economics Dr. Shimkin sees many significant chinks in Russia's economic armour. Denied Allied economic aid in the late war, as he points out, Russia could quite definitely not have survived. Dr. Shimkin does not agree with the generally accepted view that Russia is potentially self-sufficient in most minerals, nor does he hold that her mineral resources are fairly evenly distributed. It is possible that since he completed his survey (in March, 1952), he might have revised his estimates of Soviet oil resources and extraction methods following the publication of the directives of the Fifth Five-Year Plan and the notable production advances claimed this year. He does indicate, however, that poor fuels are still a major economic and military problem. Self-sufficient in coal and lignite, Russia's problem of producing good coke was still acute in 1947. Iron ore resources are abundant, but there are only "limited quantities of top-grade ore" and attention will have to be paid to ore-dressing technology. The distribution of ores is unfavourable. Supplies of chromite are satisfactory. Reasonably strong in vanadium, Russia is well supplied with manganese and nickel, but not with titanium and tungsten. (For the latter she relies upon North Korean supplies.) Of the non-ferrous metals, Russia is hampered by weak bauxite resources, is nearly self-sufficient in copper, is deficient in lead and zinc and is unlikely to attain self-sufficiency in tin. Platinum resources are adequate for the time being. In radio-active minerals Dr. Shimkin's *guess* is that Russia's supplies are extremely lean. In a balanced and restrained concluding section on Russia's potentialities, Dr. Shimkin reminds us that her known mineral reserves are very large and suggests that the wealth of the Urals may be duplicated in Turkestan and Central Siberia. Notwithstanding the development of the eastern regions, the Ukraine was still, in 1950, Russia's primary mineral producer. Despite great technological advances, the lag behind the West in mineral and refining technology was appreciable. Looking beyond his end-year (1970), Dr. Shimkin advances the view that self-sufficiency within the present economic regions is unlikely, but that new discoveries of valuable minerals are very possible. However, the transformation of possibilities into reality will take "a generation or more" at least. J. F. L. L.

NEW BOOKS

Aircraft for All. By S. E. Veale. (Ward Lock & Co., London; 254 pp.; 73 illustrations and Index; November, 1954; 12s. 6d. net.) This book traces the events that led to the conquest of the air, outlines the major technical advances that have brought the aeroplane to its present state of efficiency, explains the basic principles of aircraft design and construction and defines the forces acting upon the aeroplane in flight. There are chapters describing the piston aero-engine, the different kinds of turbo-engines, the principal instruments and main items of equipment. The final chapter and the fine set of illustrations and diagrams form a useful aid to the art and practice of Aircraft Recognition. Although the subject is a highly technical one, the book is written in the language of the layman. The author has provided a most useful reference book for all those interested in aviation and in particular a most helpful handbook for those not at present familiar with the wide field that a full study of aviation covers.

Green Beret, Red Star. By Anthony Crockett. (Eyre & Spottiswoode Ltd., London; 221 pp., 13 illustrations; October, 1954; 18s. net.) This book tells vividly of the experiences of the Royal Marine Commandos during their two years in Malaya, describes the country in which they lived and fought against those terrorists who wore in their caps "The Red Star." Besides the descriptions of operations, jungle patrols and ambushes, the author evokes the conditions under which they were carried out, the disappointments and frustrations which confronted Major Crockett and his men, and the unremitting, relentless war against an enemy who so often was elusive and invisible. He describes in detail how men lived, sometimes for long periods, in the jungle, *how they received their supplies from the air, how casualties were evacuated by helicopter,* how and what they ate and the clothes they wore. Woven into this story is the part played by all who are co-operating in the struggle to rid Malaya of Communism. This book further reveals how the present situation first



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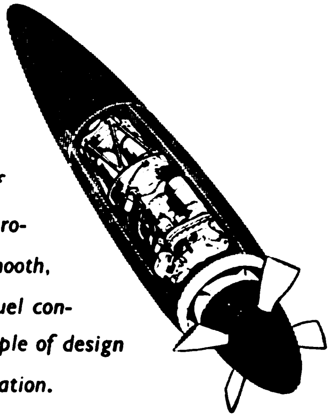

arose, how important is the attitude of the Chinese, who form a large and influential proportion of the population, and how their capacity for "sitting on the fence" hampered the activities of the Security Forces. And through it all is revealed something of the terrorists' way of life and the character of the men and women who make up their organization.

Flight Handbook. By "Flight" Staff. Fifth Edition (Iliffe & Sons, London; 282 pp., 200 illustrations; September, 1954; 15s. net.) It is only just over ten years since the last major revision of this handbook was printed; but in that comparatively short time aircraft gas turbines—jets—have become an everyday reality, supersonic flight a normal occurrence and passenger travel by turbine air liners commonplace. Even atomic power units, offering possibilities of almost unlimited range in endurance for a few pounds of fuel, have passed the discussion stage. It is the purpose of this new edition of *Flight Handbook* to provide basic information on aeroplanes, their engines, and a great number of associated aviation subjects. Contents: Foreword—The Atmosphere—First Principles of Aerodynamics—Aircraft Structures—Landing Gear—Aircraft Controls—Fixed-Wing Powered Aircraft—Gliders and Sailplanes—Rotorcraft—Balloons and Airships—Piston Engines—Gas Turbines—Ramjets, Pulsejets and Rockets—The Installed Power Plant—Airscrews—Auxiliary Power Systems—Cabin Equipment and Furnishings—Aircraft Armament—Instruments—Navigation—Index.

Neville Duke's Book of Flying. Edited by Edward Lanchbery. (Cassell & Co., London; 120 pp.; over 100 pictures and diagrams; September, 1954; 9s. 6d. net.) This is a book for young Britons who are air-minded and who need no introduction to Neville Duke. The author takes his readers into the cockpit of a D.H. Vampire and tells them how to fly it, he draws attention to the need to navigate it, and proceeds with instruction which should enable them to plot a course to anywhere in England. They will find in this book the inside story of record-breaking flights, the experiences of a fighter pilot in action, a navigator's in the first 1000-bomber raid—flying a Sea Hawk from an aircraft carrier, the story of the development of helicopters, a brief history of fifty years of flying and, to finish, a glimpse into the future.

To Perish Never. By Henry Archer and Edward Pine. (Cassell & Co., London; 188 pp.; September, 1954; 9s. 6d. net.) This is the story of a bomber crew from the time of arrival at their operational squadron, from an operational training unit, until the end of their first operational tour. It certainly portrays vividly life on a Lancaster bomber station in war—the simple comradeship, the intricate planning, the fear of yet unstinted devotion to the job in hand and unobtrusive courage of ordinary men, drawn from ordinary homes, who formed the greater part of the bomber crews which contributed so greatly to our victory. The authors take their readers with them through the dark hours of flying in the ever-present menace of fighter-attack; through the hell of the turbulent night above target, amidst the probing searchlights, the seemingly impenetrable flak barrage, and the flares and burning inferno below; as well as the long journey in the darkness home with the anxieties, strain and fear that such a trip must arouse, even in the reading of it, in those who have been spared the experience. The story is nevertheless lightened by clever character sketches of Royal Air Force personnel on the station, and many will be introduced for the first time to the secrets which surround the "briefing" and "de-briefing" of crews detailed for bombing sorties. Reality is lent to this interesting account of life in a bomber station by the fact that Henry Archer, D.F.C., was a bomber pilot who joined the R.A.F. straight from Cambridge, and Edward Pine, formerly at Oxford, was an Intelligence officer—both in No. 5 Group of Bomber Command. It is a good story, written in a style that makes easy reading and embodying a first rate description of those, from all walks of life, who did such a grand job of work in World War II.

Brassey's Annual—The Armed Forces Year-Book, 1954. Edited by Rear-Admiral H. G. Thursfield. (William Clowes & Sons, London; 483 pp.; 23 full-page illustrations; also statistical tables and maps; October, 1954; 63s. net.) This year's edition has an increased number of pages and maintains the very high standard of previous issues. It is a mine of information on defence and deals with all three Services, as well as some details of the defence forces of foreign Powers. In view of the predominant importance of "Air Power" today to the national Defence Force, we should have appreciated the inclusion of articles by high ranking officers of the Royal Air

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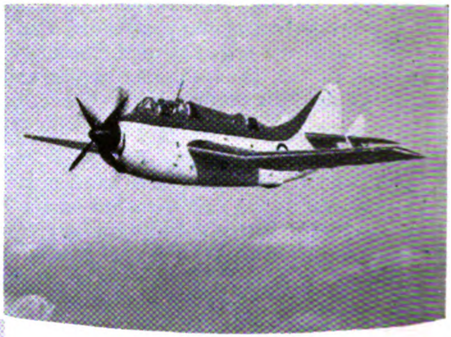

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Force. Of the 27 chapters from the pens of Service personnel—23 are from officers of the Navy and Army and but four by officers of the Air Force. Among the remaining seven chapters there are articles of "air" interest and include—"Communist Air Forces" by Asher Lee, O.B.E.; "Total War" by J. M. Spaight, C.B., C.B.E., LL.D.; "Air Power and the Land Battle" by E. Colston Shepherd; and "Gliding and its possible value to an Air Force" by Philip Wills, C.B.E. The four chapters by Air Force officers are: "The Rôle of the Bomber," a most interesting article by Wing Commander C. N. Foxley-Norris, D.S.O.; "Training in the Royal Air Force" by Wing Commander J. A. Holmes, D.F.C.; "Aircraft Development" by Group Captain G. W. Williamson; and "The Royal Air Force Today" by Air Vice-Marshal W. M. Yool, C.B., C.B.E., which in the brief space of seven pages could hardly do justice to so comprehensive a subject. The keynote of "Brassey's Annual" is to emphasize the essential need for unity of the three Services as members of the nation's defence team, the part and burden each is expected to take is clearly defined in the Reference Section of this publication "Statement on Defence." The information available in "Brassey's Annual" should enhance the knowledge of all concerned in their Sister Services and help towards unity of purpose in a common aim. This book is a very valuable contribution to Service literature and full of information for bringing up to date any study of the armed forces.

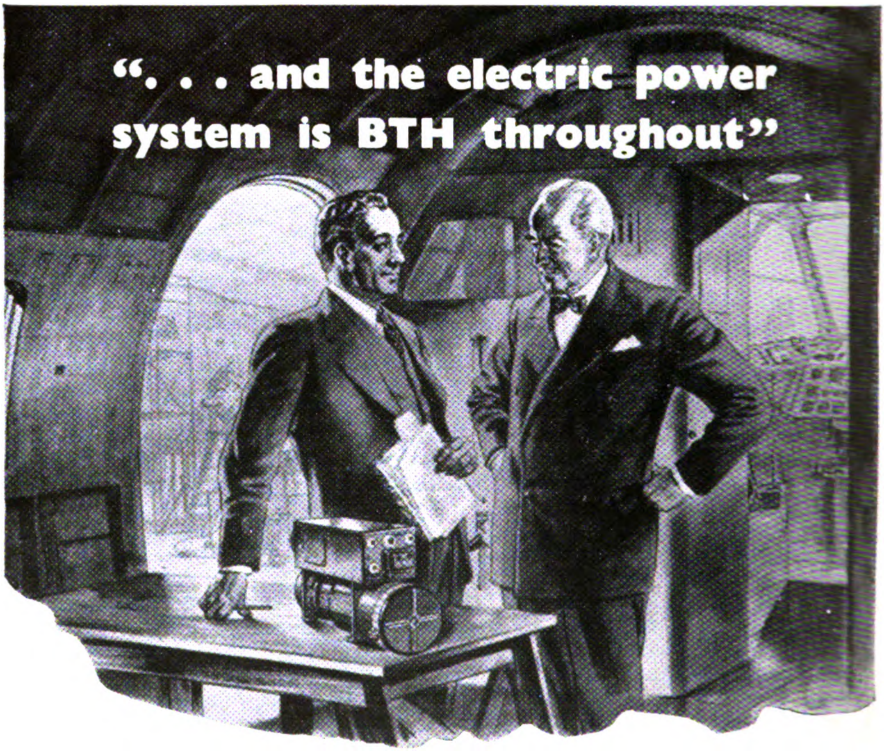
Aircraft To-day. Edited by John W. R. Taylor. (Ian Allan Ltd. London; 104 pp., over 100 illustrations and diagrams; November, 1954; 9s. 6d. net.) The Editor in his Foreword states that ". . . this book explains what is happening in Aviation today —how soon delta-wing bombers are likely to give way to pilotless guided weapons . . . and even what chances there are of seeing a 'Flying Saucer.'" **Aircraft To-day** does all of this and a good deal more, containing as it does articles by fourteen contributors, some of them world famous. Sir Frederick Handley Page sketches briefly but interestingly the progress of aviation, by recounting the milestones of flying, from the Wright brothers to the latest crescent-winged jet liner on his firm's drawing boards today, which he claims will cross the Atlantic at a direct operating cost of £14 a passenger. The Editor's own "Review of World Aviation" provides an interesting and easily understood article depicting just what the title of this book proclaims. Anthony Kunesch (co-author of "Space Travel") contributes some interesting thoughts on "Flying Saucers"—but still leaves one in doubt as to whether they are fact or fantasy. Of considerable interest are two opposing views on "Air Power and Sea Power": those of a sailor by Rear-Admiral H. E. Horan, C.B., D.S.C., and (dare we say it?) a more modern view by an airman, Air Marshal Sir Robert Saundby, K.B.E., C.B., M.C., D.F.C., A.F.C., which gives a very clear picture of the respective responsibilities which fall upon these two powers in modern war and why. A glance into the experimental build-up towards "space travel" is given by Maurice F. Allward, in a sufficiently light style to make these experiments understandable to the uninitiated, bringing that "Journey to the Moon" to the realms of possibility from fantasy. There are many other articles by well-known authors which make this book most interesting as well as instructive.

A. H. S.

The World's Fighting Planes. By William Green and Gerald Pollinger. (Macdonald & Co. Ltd., London; 237 pp., nearly 500 illustrations and detailed three-view silhouettes; November, 1954; 12s. 6d. net.) Details of military aircraft of the world's Air Forces flying today. This small book contains a most comprehensive collection of the fighting aircraft of *all* nations.

The Observer's Book of Aircraft. 1955 Edition: Compiled by William Green and Gerald Pollinger (287 pp., describing 216 aircraft with 309 illustrations; November, 1954; 5s. net.) Another small, pocket-sized book, with details of military and civilian aircraft, this revised edition has 150 new illustrations and up-to-date information on the latest developments in aircraft design. For handier reference, the aircraft are now arranged alphabetically throughout the book.

Aircraft of the 1914-1918 War. Edited by D. A. Russell, M.I.Mech.E. (Harleyford Publications, Marlow; 127 pp., 234 photographs and 80 plans; November, 1954; 42s.) First published in 1946, this book now has numerous additions and provides a very complete historical record of military aircraft of the First World War, giving the fullest details of their weight, load, performance, power plant, armament and operational history.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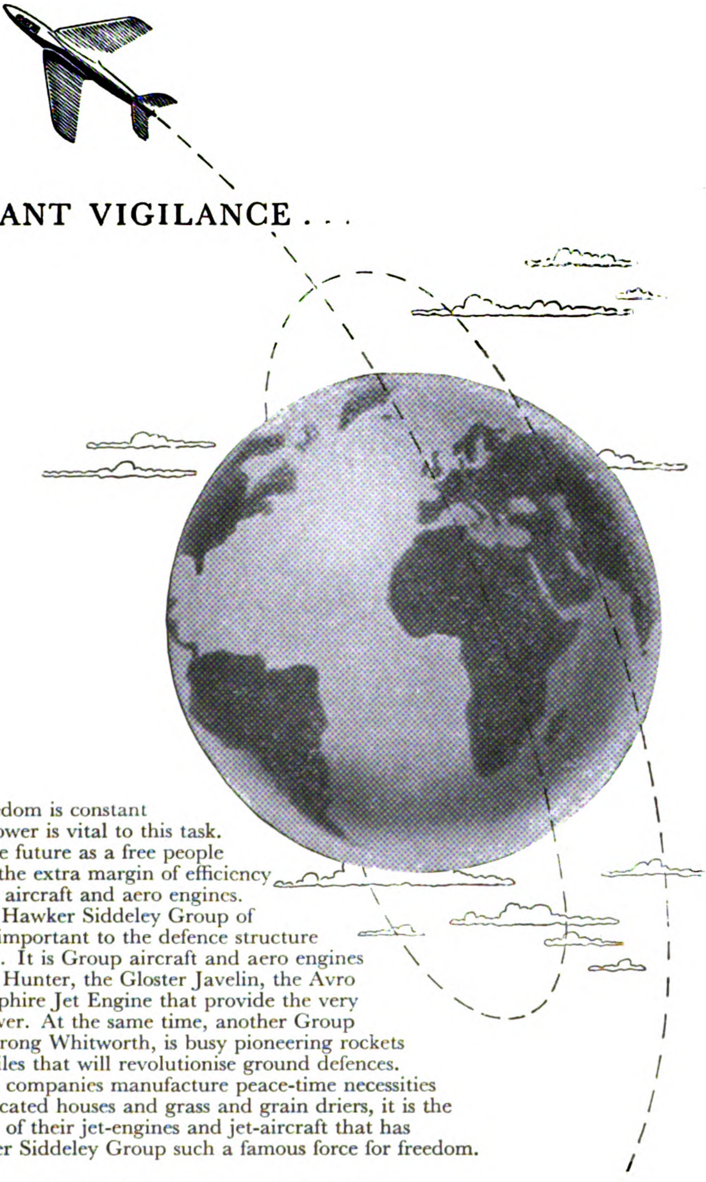

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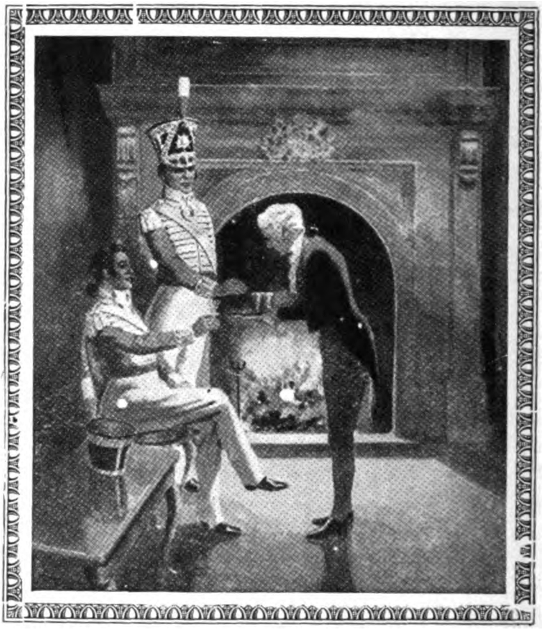

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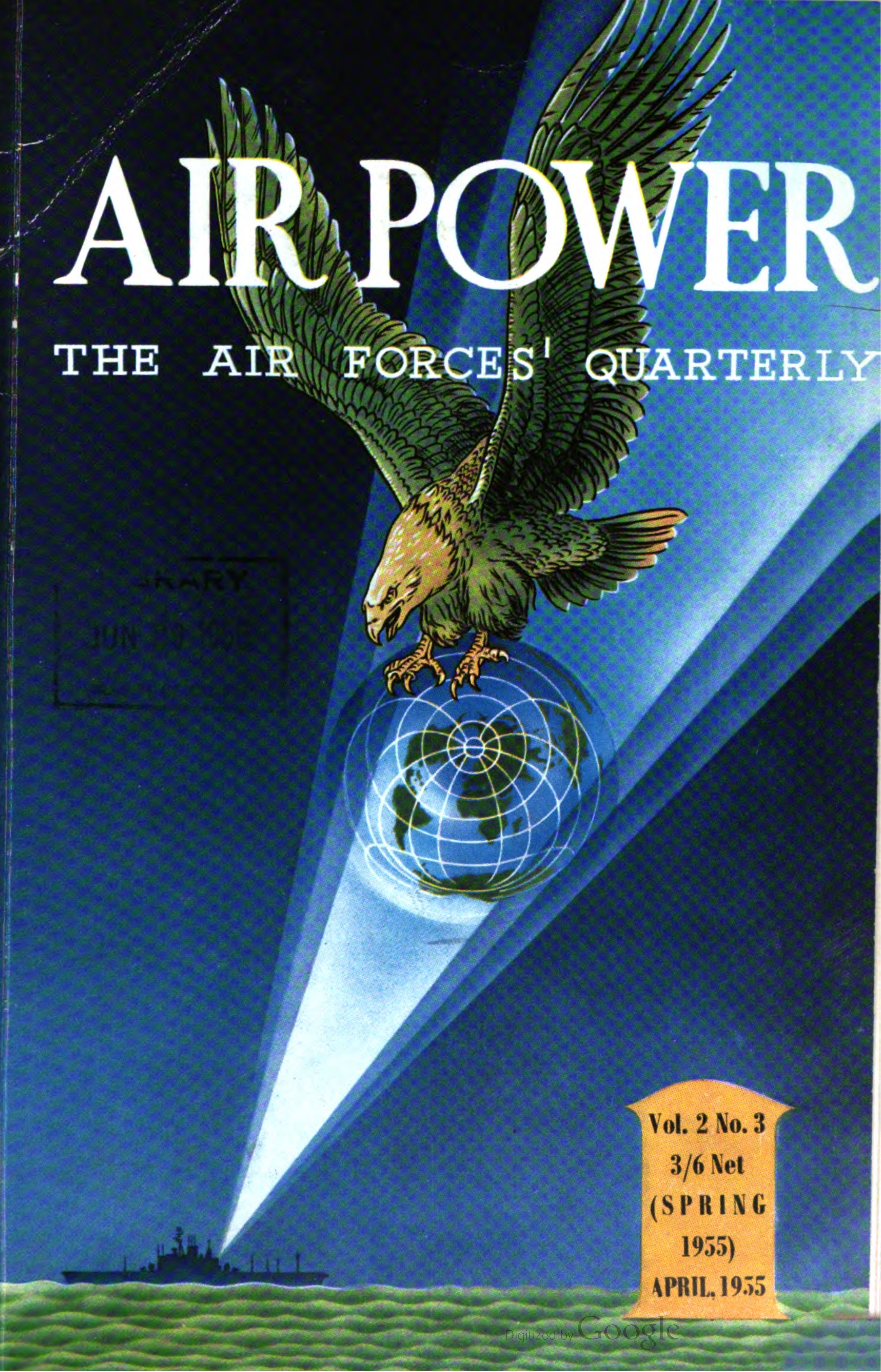

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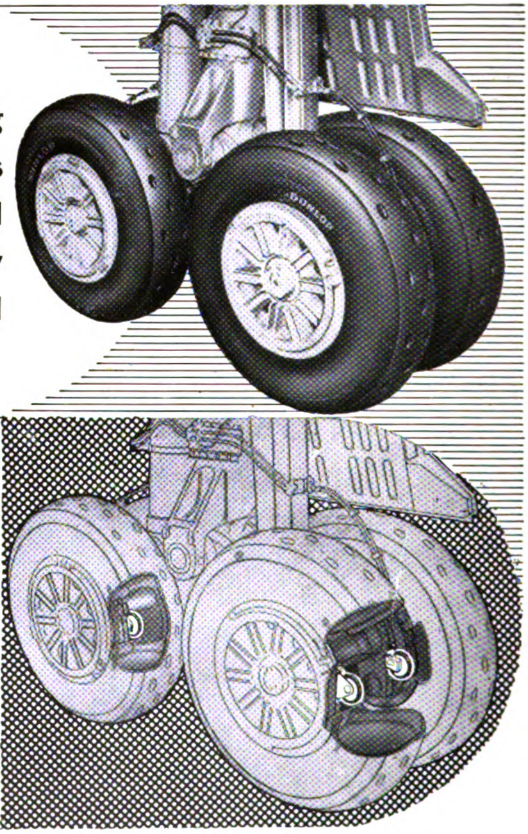

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EDITORIAL

OUR DEFENCE—(MARCH, 1955)

HER Majesty's Government's "Statement On Defence, 1955," the three Services Ministers' explanatory statements on their "Estimates" and the debate in Parliament on Defence, provided plentiful material from which to study the present state of our Defence Forces and what is proposed for the future.

The keynote for the future is "Defence through Deterrents," and lurid descriptions of the possibility of annihilation of millions of both attackers and attacked must have even caught the attention of "The man-in-the-street" momentarily, before with a shrug of his shoulders he lapsed back into his normal state of apathy. Those with any connection with the Navy, Army or Air Force will have taken more interest and, whatever the extent of their knowledge, however influenced by political views or leanings towards this or that Service, will have found agreement in their conclusions that the present state of our defence is unsatisfactory, but also considerable hope in Her Majesty's Government's new proposals.

Two decisions stand out in importance above all others:

(i) To proceed with the production of the Hydrogen Bomb.
(ii) To use it immediately against Russia if she attacks us.

WITH the overwhelming superior strength of the Communists' *conventional forces*, compared with those of the Free World, having decided to defend ourselves, what other hopes had we of counterbalancing that superiority, other than by using the only weapons in which we have predominance enough to give us hope of survival.

It has been America's possession of, and immediate readiness to use, both Atom and Hydrogen bombs in devastating retaliation directly any attack is launched against us, that has been the cornerstone of our defence and will continue to be so until we are in a similar position ourselves. Is it to be wondered at that Russia continues, by every means in her power, to have atomic and similar weapons abolished from the world's armaments? Which would then leave her all powerful militarily to achieve her avowed purpose of Communizing the whole Free World.

Not only as a deterrent, but also if we should be attacked, the possession of such weapons in adequate quantity, with the means of delivering them to selected targets swiftly, are not only likely to reduce the weight of similar air attacks upon us, but also to disrupt the advance across Europe of Russia's vastly superior land forces.

We hope that knowledge of the frightful retribution which would follow any attack upon us will continue to act as a deterrent to the would-be aggressors, giving us at least temporary (if uneasy) peace, until saner council prevails among Communist rulers. Then, with the knowledge that aggression in Europe means major war, which could only result in the annihilation of almost the entire population of both sides, discussions at top level on general disarmament and the lessening of tension between Communists and the Free World can take on an honest complexion.

Whether such a war would bring to an end the Civilized World, only scientists can speculate upon. More likely, from the frightful devastation would arise "Phœnix-like" in the course of time, at least a world aware of the consequences of Nuclear Warfare and, from such knowledge, a true love of peace would thrive in all peoples.

WHAT is planned for the future of the Royal Air Force, with Sir Winston Churchill's opinion that war is unlikely within the next three or four years, appears more hopeful than the reckoning of what has been accomplished in the past. Even with only three Fighter Command Squadrons equipped with Hawker Hunters, which seems little enough, more squadrons are being similarly armed this year, as well as the delivery of all-weather Javelin fighters. We can only hope the numbers will be effective and that the air-to-air guided weapons on order will soon be delivered also.

With the Valiant there have been remarkably few development troubles and we were informed that delivery has begun and that the development and production of the Vulcan and Victor will proceed with growing momentum this year. There was no statement, however, as to when newer types of aircraft, such as the English Electric P.1, would be available for squadrons.

For Transport Command, orders have been placed for the Comet II pending delivery of the Vickers 1000 long range jet transport, and Blackburn Beverley's production models are coming off the line.

With the momentous decision of "Defence by Deterrent," the Royal Air Force's primary task is to build up her "V" Bomber Force with its Nuclear Potential, and we shall look for early developments in this.

Britain will then be in a position, if necessary, to select targets of our own choice at the outset, which we consider vital to our survival.

WHAT has been determined for air power is of considerable consequence to the Army, as are statements of the Army's part in defence to the Royal Air Force. The decision to oppose any attempted advance across Europe by the Communists will require considerable support from the air. To check such advance is clearly essential to our air defence in allowing us the use of our forward bases, not to mention the advantage of slightly extra warning by Radar of air attack and the disadvantages to us all if we could be subjected to guided-missile attack across the Channel. General Gruenther is reported to have said, "*When* we get the German contingent we will be able to depend on what we call the 'Forward Strategy'." We can only assume that without the necessary added strength of German ground forces, the Rhine would be our line of defence, leaving most of Germany to the Russians. This would be, to say the least of it, regrettable.

Despite the challenge of Her Majesty's Opposition Party in the parliamentary debate, we support the maintenance of adequate conventional forces, for the purpose outlined above and to play their part throughout the world in combating local Communist aggression, infiltration and subversion, which are Russia's only alternative means to a major war in achieving her intentions.

AGAIN welcome, but somewhat late, is the decision "to organize an efficient Civil Defence, which will include a Mobile Defence Corps consisting of parts of the Army and Royal Air Force reserve forces." Devastating as the destruction might well be, much "can be saved from the burning," and the more that is saved, the longer will the morale of this nation stand the frightful strain that such attack envisages.

REGARDING the role of the Royal Navy in our defence, mainly as viewed from the explanatory statement issued on the Navy Estimates, this proved disappointing.

The First Lord's explanation was full of optimism but vague. There was no indication when the projected guided-missile cruisers and all the proposed new type aircraft (N.113, D.H.110 and new strike aircraft to replace the Wyvern) would be available.

We were equally disappointed on the reversal of opinion which now makes the aircraft carrier the core of the Navy.

The suggestion that warships in Nuclear Warfare are more elusive, more quickly dispersed and reassembled than land-based bombers requires a good deal of thought. when comparing the speed of numerous modern bombers departing on elusive action with the speed of an aircraft carrier and close escort.

The attractiveness to atomic attack of a target, carrying so many aircraft, costing £21,500,000 (exclusive of aircraft, guns and equipment) and taking ten years to replace, is indisputable; but adequate defence for her against such an attack is debatable.

Mr. Thomas, First Lord of the Admiralty, is reported* as saying: "The Navy still has the age-old problems of ensuring control of sea-communications, although in achieving this task it is continually adapting itself to new conditions. *The only tried and tested instrument for securing and maintaining this control is the Navy. . . . Fleet Carriers like the 'Eagle' and 'Ark Royal' can bring all the resources of a fully equipped modern airfield to within a few miles of a hostile shore anywhere round the world.*"

In stating these, what he termed, simple and fundamental truths, he seemed to have overlooked:

(i) The tried and tested co-operation of the Royal Air Force in securing and maintained sea communications in the last war.

(ii) Radar detection, the vast strength of Russia's Air Force possessing atomic bombs and guided missiles, their submarines, or the fate of such a target approaching to within a few miles of a hostile shore.

What was not included in the explanatory statement to the Estimates was that our future Navy, as envisaged, could not alone keep open the sea routes to this country, and that considerable help from the Royal Air Force and the Air Forces of our allies would be essential. Naval forces alone could not do so.

(Having in mind the abortive attempt a year ago by a Member of Parliament to censure this Journal for its views†, we make it clear that these are not official opinions but those of the author only.)

WITH the continued threat to the Communists from our ally America, of instant and devastating retaliation from her superior strength in Atomic and Hydrogen weapons, maintaining an uneasy peace, we can hope that our united strength when our own new plans for defence mature, will open the way to world disarmament and the peace the peoples of the world pray for. In the meantime we have a heavy burden to bear. We must be industrious and vigilant.

---

* Speaking early in January at a dinner of the Worshipful Company of Coachmakers and Coach Harness-makers.

† 17th March, 1954.

MORALITY AND WAR: A BRITISH VIEW*

BY AIR MARSHAL SIR ROBERT SAUNDBY, K.B.E., C.B., M.C., D.F.C., A.F.C.

THE recent series of "H" bomb tests in the Pacific has produced a considerable reaction in Britain. The bomb has been condemned on moral grounds in a flood of speeches, articles and letters to the Press. Many of these are intended to shame or frighten the public into demanding the abolition of the bomb, or at least the cessation of its development. Though possessing a superficial resemblance in their appeal to moral and humanitarian principles, most of these attempts to influence public opinion against the "H" bomb are inspired by varied motives.

The Communists and their fellow-travellers want to abolish the "H" bomb, and the "A" bomb too, because these weapons are the biggest, and perhaps the only, deterrent to Russian and Chinese aggression. And many well-intentioned people, who are by no means Communists, add their voices to this appeal because they are moved by a vague but powerful humanitarian impulse. They are people who feel rather than think.

Then there are the pacifists, who are opposed to all measures for the defence of the Free World, and who cling to the belief that if we refuse to arm ourselves and resolutely close our eyes to the dangers of aggression, war will never happen. The ostrich, when confronted by a dangerous situation, is said to bury its head in the sand, believing that it is as effectively hidden from its enemies as they are from it. The pacifists are human ostriches; people who think that if they shut their eyes to danger, they have succeeded in averting it. Such people are impervious to argument, and ignore the lessons of history. Each new development in modern weapons evokes in them only a demand for the unilateral disarmament of their own country. Nothing can be done about them, but they do not gain many converts, as a rather special type of mental unbalance is necessary for the holding of such convictions. I suspect that genuine pacifists are born, not made.

Next there are the defeatists, who believe that we have not a hope anyhow if war should come, and that we must therefore be prepared to put up with anything and everything rather than face up to aggression. An extreme example of this way of thinking can be found in the recent action of the Coventry City Council. This misguided body has voted to disband the city's Civil Defence Organization on the grounds that everything is hopeless, and that nothing can be done to mitigate the effects of the "H" bomb. Many of the defeatists have an extraordinary faith in the effectiveness of talking and manage to believe, in spite of the overwhelming evidence to the contrary provided by the last seven years, that if only we go on talking long enough, we can make satisfactory agreements, which will be honoured, with those who are our bitterest enemies. And finally there are those who are trying to make political capital out of the "H" bomb, on the grounds that any stick is good enough to beat the Government.

These various sects—except possibly the last—though extremely vocal, are not numerous, and represent only a very small percentage of our population.

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* Republished from the Summer, 1954, issue of the *Air University Quarterly Review* (U.S.A.F.) by kind permission of the Editor.

This reaction to the "H" bomb will come as no surprise to a student of history. The invention of new weapons of war has always brought about an outcry against them on moral or humanitarian grounds, and attempts have been made, again and again, to prohibit their use. Nowhere can this be more clearly seen than in the invention of gunpowder. It is said to have been discovered by an ancient Chinese philosopher. On hearing about it, the ruler of the province sent for him and required him to give a demonstration. Having satisfied himself that the thing worked, the enlightened ruler saved humanity from this particular horror for many centuries by having the inventor humanely executed and every trace of his invention destroyed. Whether this is fact or legend I do not know, but it is certainly in line with the attitude of civilized peoples towards new weapons of war.

When gunpowder reappeared in the Middle Ages, providing the foot-soldier with a weapon capable of penetrating personal armour, it was vehemently opposed by the knights, who saw that their predominance on the battlefield was seriously threatened. The use of gunpowder in war, except against infidels, was forbidden by an ordinance drawn up by an Oecumenical Council, which, it is hardly necessary to add, was never effective. It is closely paralleled by the proposal, tabled at the Disarmament Conference at Geneva in 1932, more than 500 years later, to abolish aerial bombardment except in undeveloped countries. Indeed, while it is usual to find attempts made to ban or limit new weapons, it is rare to find such attempts meeting with any success.

One example, that of chemical warfare, is frequently quoted as a successful attempt to ban a weapon of war. It is true that gas was used by both sides in the First World War, and not used at all in the Second one. It is also true that a convention prohibiting its use was signed by a large number of nations soon after the end of World War I. But although the United States did not sign it, and the Soviet Union did not ratify it, neither of them used gas in World War II.

If we look more closely into the matter, it seems probable that the reason why it was not used is to be found in an appraisal of its military value to the Axis Powers, rather than in the deterrent effect of the convention. The truth is that chemical warfare makes life unbearable for the belligerent nations. Everyone—men, women and children, service or civilian—has to wear, or be ready at a moment's notice to wear, uncomfortable respirators and heavy protective clothing. The penalty for a moment's unreadiness, night or day, may be death. The insidiousness of the attack, the fear that a gas, invisible and odourless, may have already fatally damaged lungs or nerves, has a powerful morale effect, especially on untrained civilians.

The disadvantages, therefore, are very real, and no doubt in the German view they outweighed the possible advantages. The Axis Powers thought that they could win the war quickly without resorting to chemical weapons and thereby exposing their civilian population to its miseries. Later, when they might have considered using these weapons to avert defeat, it was too late. They had lost command of the air, and could not face the awful retribution which the use of gas would have brought down upon them.

It is therefore important not to allow ourselves to think that the existence of the convention is an absolute safeguard against the use of chemical weapons in any future war. It is nothing of the sort, and it is still necessary to study the subject, and be prepared to defend ourselves against a surprise attack of this nature.

There is another factor which, in Britain, tends to encourage attempts to ban or limit new weapons, though it has more to do with our national psychology than with morality. Our deep sense of military tradition, combined with a natural conservatism in these matters, makes us reluctant to adopt new methods and weapons and turn our backs on the old familiar things that have served us so well in the past. The most obvious example of this is our unwillingness to give up our reliance on sea power as our first, and almost our only, line of defence. For centuries we have relied upon our fleets, not only to guard our shores, but to keep war as far away from us as possible. We have been brought up on Bacon's famous dictum that "he that commands the sea is at great liberty, and may take as much or as little of the war as he will." This was true enough when Bacon wrote it, and indeed it remained valid until the coming of air power. The success of our sea power in dealing with France during the Revolutionary and Napoleonic wars, brilliantly expounded by Admiral Mahan, profoundly affected our national way of thinking.

But nowadays our Navy cannot protect us from invasion, nor can it keep war away from our shores. Even as long ago as the middle of the eighteenth century, a First Lord of the Admiralty unwittingly defined the limitations of the Navy when he declared to a Parliament apprehensive about the possibilities of an invasion by France: "I do not say they will not come. I only say they will not come by water." In those days they could come in no other way, and his assurance calmed the nation's anxieties. But nowadays they do not need to come by water, with the mainland of Europe only a few minutes' flying time from our coasts.

The Navy still has a great job to do in time of war in protecting our ocean convoys, conducting anti-submarine warfare at sea, and anti-mining operations. None of these tasks are easy, and they are capable of fully absorbing the efforts of the Navy for a long time to come.

Our island situation and our successful reliance on sea power for so many centuries have encouraged in our people an almost unconscious belief that war is properly a remote thing in which the civilian population ought not to be involved. Apart from civil wars, all our fighting since 1066 has been done on the high seas or in other people's countries. We were deeply and genuinely shocked in 1914 when the Kaiser's U-boats began to sink our merchant ships at sight. We had previously relied on the "rules" of warfare at sea, under which a merchant vessel could not be sunk unless its civilian crew had first been put in a place of safety.

One of the main reasons for the unwillingness of our people to admit that air power has replaced sea power as our first line of defence—and as our principal means of keeping war away from our shores—is that air power is still regarded with a good deal of repugnance, partly moral and partly psychological, because it is held to involve civilian populations in war. We forget that blockade, one of the main instruments of our sea power in the past, relied for its effect mainly on its power to starve the enemy populations of food, clothing and the raw materials needed for their very means of livelihood.

The result of all this interplay of warlike experience, shared by the civilized nations of the world, is a body of doctrine about the morality of various methods of warfare. This doctrine is certainly not founded upon logic and, indeed, if any underlying principle can be discovered, it appears to be merely that of use and custom. Every development is opposed at first, then accepted with reluctance, and later with resignation. Finally it acquires, with age, a kind of respectability which bears no relation to its fundamental decency or humanity.

For a very long time, until the coming of air power, the "classical doctrine" ruled the conduct of war. This doctrine laid down that the object in war must always be to bring the enemy armed forces to battle and destroy them. Such destruction, in the old days of simpler weapons, had to be achieved mainly by killing men. Thus, to the man in the street, the idea of killing enemy soldiers and sailors was quite proper and indeed praiseworthy, while the idea of killing enemy civilian factory workers engaged in making weapons of war, or the crews of merchant vessels engaged in transporting them and other vital strategic goods, was immoral and unjustifiable.

But although people, through long usage, have become accustomed to the idea of killing soldiers and sailors, it must be noted that it is permissible to kill them only in certain ways. They may be blown up, drowned or burned, shot or bayoneted, sliced with sabres, or impaled by lances. Boiling oil or molten lead could be poured upon them. But they may not be painlessly killed by gas or even anæsthetized. They may not be infected by disease, not even by a disabling but non-lethal disease. And yet it is not easy to prove that to gas a man or incapacitate him by disease is more immoral or even less humane than to burn him alive, impale him, or tear off his arms and legs with high explosives. The fact is, of course, that in time we get accustomed to things that in themselves are very horrible, and thus reconcile ourselves to their use. We shrink with horror from new methods and new weapons, even though they are demonstrably more humane, simply because they are new.

If then there is no logic in our moral attitude towards new developments in warfare, and if anything, however terrible, will be accepted and become respectable in time, can we not adopt a more intelligent approach to this subject? What is needed is a re-appraisal of the vast range of weapons which scientific progress and human ingenuity have put at our disposal, in terms not of age and consequent respectability, but on their merits. We should assess them in terms of their effectiveness and, as far as is possible in war, their humanity.

It needs more than a little moral courage to take such a course. It is so easy to gain the plaudits of the multitudes and, in a democracy, their votes, by appealing to humanitarian feelings, on the one hand, and fear of these terrible weapons on the other. Those who keep their eyes open and, avoiding false sentiment, advocate rational measures which will—as far as that is possible nowadays—provide security, are apt to be stigmatized as warmongers.

Let us, however, make an effort to separate the sense from the nonsense, and evaluate the present situation in the light of reason and experience.

The basic assumption with which I would start is that every sane person in the Free World, without any surrender to the forces of evil, wishes to avoid a third World War. Shall we achieve that end by bringing pressure to bear on the United States to stop the development of the "H" bomb, leaving all progress along those lines to the U.S.S.R.? I can imagine no course of action more likely to bring about a global war, ending in the defeat of the Free World. Can we afford to trust any totalitarian state, especially one whose avowed object is to communize the whole world, if the rulers of that state know that they are the sole possessors of the master weapon of the age?

There are those who advocate that, whatever anyone else may do, the civilized nations of the Western World have a moral duty to bind themselves by a solemn declaration never to use the "A" or "H" bombs in war. I believe that, next to stopping the development of these weapons and leaving the field to Russia, this would be the most dangerous course that we could take. Even to let our potential enemies believe that we should hesitate to use them if attacked would be to bring the danger of a third World War appreciably closer.

Then there is the proposed abolition by all nations of these weapons of mass destruction, under a proper system of international control. There is, of course, much to be said in favour of this, provided that two conditions are fulfilled. First, the system of inspection and control must be really effective; it must be not only fool-proof but knave-proof. It cannot, for example, be left to the Security Council of the United Nations, in which Russia has the power of veto and does not hesitate to use it. And I wonder how many people realize just how great an invasion of national sovereignty such a system of inspection and control must involve. Secondly, the abolition of these weapons must be linked to, and conditional upon, a satisfactory reduction of conventional armaments. If this were not done, the Communist Empires, with the manpower of half Europe and Asia at their disposal, could and would possess land forces that the Free World could never hope to match. With our air power robbed of its decisive weapon, and our sea power helpless against their huge continental land masses, the Communist armies would be invincible.

We cannot therefore separate the "A" and "H" bombs from the whole question of the limiting and control of all armaments. This is an immense task and given the greatest good will—of which there is not much evidence in some quarters—it would take years to accomplish.

What, then, should be our policy in the meantime? I suggest that, while never losing sight of the importance of achieving general disarmament with effective safeguards, we must rely upon a balance of power.

The Free World must balance the vast manpower of the Communist Empires, channelled into great land forces, by superior air power equipped with the most powerful weapons that science can provide. For some time to come —perhaps for a long time—we can rely on being ahead of the Communists in our "know-how" of the use of air power, in our radar, and in other modern techniques. As Major de Seversky has pointed out, the very fact that both Russia and China are compelled by their circumstances to maintain huge armies will limit the effort that they can put into the development of their air power and all the ancillary industries on which it must depend.

But there will come a time, sooner or later, when the Communists will have enough "H" bombs to devastate the principal cities and centres of administration in the Free World. What will happen then? Will the balance hold, or will the deterrent power of these weapons of mass destruction fail us? It can be argued that a sudden surprise attack could, at one blow, cripple the organization and industry of the United States and the British Commonwealth. This may be true, but it is equally true that the North Atlantic Treaty Powers will possess a large number of air bases, well dispersed throughout the world, and unless these were all simultaneously destroyed—an almost impossible proposition—the next few hours would see the destruction of the Kremlin and all the larger industrial and administrative centres of Russia and China.

It seems to me, therefore, that not only will the balance hold, but that, as Marshal of the Royal Air Force Sir John Slessor said in a recent broadcast, the coming of these new weapons will put an end to global war. No sensible nation would begin a large-scale war unless it could see a good prospect of improving its position; there must be reasonable hope that the war can be quickly won, and give some advantages to the victor. What chance is there of that nowadays? And surely no one, not even the most power-mad dictator, would resort to war if he knew, beyond all doubt, that within a few hours his capital city and all the vital centres in his country would be destroyed beyond hope of repair.

We ought, I suggest, to use the next few years, before the Communists have a sufficient stock-pile of "H" bombs, to regain the diplomatic initiative. We cannot be satisfied with a *status quo* which leaves whole nations at the mercy of the Red army and the Secret Police. We must find means, short of war, of compelling the Communists to relinquish their hold on the countries that they now occupy, and force them to withdraw behind their own frontiers.

I do not think that this is so impossible a task as is commonly believed. The essence of the problem is to take one step at a time—perhaps a very small one at first—and gradually, carefully, to gain one point after another. And in the background, unseen but all-powerful, would be the threat of overwhelming N.A.T.O. air power. Time will be needed and great diplomatic skill and, of course, it is undeniable that risks must be run. But we must be prepared to face them, and we must have a policy so flexible and resourceful that at no time will any situation threaten to get out of hand. This will be a supreme test of statesmanship, but I believe that once a policy such as this has been decided upon, the men who can carry it out will always be found.

And so, under the shadow of air power wielding weapons of terrible potency which, by God's grace, we shall never have to use, we may hope to free the enslaved peoples of the world, and keep the peace until the canker of Communism, as some day it surely will, has passed away. We should therefore, I suggest, reject the spurious morality that shrinks from the acceptance of the master weapons that science has given us, and embrace the higher morality that bids us take advantage of their existence to abolish the new slavery, and exorcise from the world the evil ideology that threatens twentieth-century humanity.

FOUNDATIONS FOR A FREE WORLD AIR FORCE

By Donald W. Cox,

Educational Advisor, A.C. & S.S., Air University

IN the "peaceful" days before World War II there appeared a filmed version of H. G. Wells' famous science fiction fantasy, *War of the Worlds*, entitled *Things to Come*. In the movie adaptation of the novel, Raymond Massey portrayed a leader of an organization called "Wings Over the World." This association consisted of a group of allied airmen who were attempting to reunite a shattered world where intense havoc and destruction had been wrought by the invaders from Mars.

Bringing H. G. Wells' masterpiece of future events up to date is no difficult matter when one transposes the Communist powers for the Martians. With such a transformation, one wonders if Wells was too far off in his predictions of things to come. Actually, much spade work has already been accomplished in setting up a foundation for a future "Wings Over the World" to resist any invader, whether they be Martians or aggressors from our own planet. This groundwork has taken its roots in those who have attended one or more of the professional Air Force officer courses at the Air University in Montgomery, Alabama. These 500 plus officers in less than four short years have learned many of the finer points on how to successfully administer a complex Air Force organizational set-up through their studies at the Air University. The bulk of these students attend either the Command and Staff School (for field grade officers) or the Squadron Officer School (for junior grade officers) of the Air Command and Staff College in the Air University System.

A. THE ALLIED OFFICER BRANCH

The Air Force agency directly responsible for aiding, administering and integrating these officers while they are in the U.S.A. is the Allied Officer Branch of the Air Command and Staff College, headed by Major Manuel C. Castro, a Spanish-speaking Air Force pilot. Major Castro's office acts as a sort of International House for Students of the many different nationalities represented in a typical class at the Air University. The students who call the Allied Officer Branch home have come from some 42 countries, with the Philippines having contributed the greatest number to date (69), followed by Norway (48), Turkey (45) and then Belgium (3). Thailand has sent 29 Air Force officers, and Afghanistan is at the bottom of the list with only one, who, incidentally, was their Chief of Air Staff.

B. POLICY REGARDING ALLIED OFFICERS

To ensure that the proper atmosphere is created for the best American-Allied Air Force student officer relationships, General Lloyd P. Hopwood, the present Commandant of the Air Command and Staff College, Air University, has issued to his staff the following policy letter:

POLICY STATEMENT—ALLIED OFFICERS ATTENDING A.C. & S.S.

1. Allied officers attending courses at the Air University do so on invitational orders of the Secretary of the U.S.A.F. These highly selected representatives of our Allied Air Forces come to the Air University with the

Allied Air Force officers of class 54-A of the Field Officers' Course, Air University, visiting the Statue of Liberty on one of their many field trips in the U.S.A.

primary mission of gaining a better understanding of U.S. Military doctrines, procedures, concepts and capabilities.

2. Many of these officers are accompanied by their families. For most of them it is their first visit to the United States. They generally encounter the problem of adjusting themselves to living and working in a closely knit American community with its firmly established customs and traditions.

3. The presence of these Allied officers and their families affords the personnel of the Air Command and Staff School a unique opportunity to further the effective military training of our potential allies, to cultivate mutual understanding, respect and friendship, and to contribute to the prestige of the United States Air Force, the American people and the nation as a whole. Many of the Allied officers who attend our school will occupy sensitive and influential positions when they return to their respective countries. The impression these officers get of America and Americans while they are here have a great bearing on their countries' future attitude toward the United States. Inasmuch as many U.S.A.F. officers will be ordered to foreign stations at the completion of their tour, it should be recognized that friendships made during the school year may be valuable contacts in future assignments.

4. The Allied Officers Branch of the Air Command and Staff School has the primary responsibility for accomplishing these objectives. However, the personnel of that Branch cannot fully accomplish its mission without the whole-hearted support of the entire Command. At this critical point in our nation's history, it is important that each one of you recognize your personal responsibility in the furtherance of our international relationships.

5. The following suggestions indicate the fields in which U.S.A.F. officers and their families can assist the Allied students and their families to become members of our Air Force and civilian community:

(a) Take the initiative in becoming acquainted; introduce yourself, your family and your friends.

(b) Encourage and assist the Allied students and families to enter into the various activities of the Base; show them American hospitality and home life by inviting them to your homes for social gatherings, especially for typical American holidays.

(c) Assist those Allies not having cars by offering transportation to Club activities, base exchange, flight surgeon, official functions, etc. Allied officers are honorary members of the Officers' Mess and should be encouraged to use its facilities.

(d) On request by the Allied officers, assist or advise in procuring or making major purchases such as automobiles, TV sets, etc.

(e) Offer your help in translator or interpreter services.

(f) Orient students and their families in base regulations and customs.

(g) Assist Allied families to establish themselves by helping them secure furnishings from the Thrift Shop and Base Exchange or through advertising in the daily Wing Bulletin.

6. I shall expect all members of this Command to take an active and personal interest in assisting Allied students and their families in both official and social activities.

This document is one that could very well serve as a model of international co-operation not only between Allied Air Force personnel, but other American military and civilian components stationed at home and abroad in similar sensitive positions. It is but one example of the forward thinking which is taking place in one of the dynamic branches of the Air University.

[Photo: U.S. Air Force

Colonel Milton B. Adams, formerly Director of The Field Officers' Course, A.C. and S.S., presenting Diplomas to two Iranian Air Force officers who successfully completed the course.

C. PREPARATORY PHASE

For six weeks before the beginning of the regular courses in the Air Command and Staff College, the officers who will be students in the various schools and courses participate in a comprehensive training programme called the Preparatory Phase. Coupled with the first phase of the Command and Staff School, the Allied student receives twenty full weeks of U.S.A.F. professional education which is equal to the length of the old Field Officer Course or the new Squadron Officer School. This "short" pre-course consists of three functional areas to aid the Allied officer in becoming personally more secure in knowing such things as the (1) organization and basic operating principles of the U.S.A.F.; (2) English language; (3) American Culture.

1. **Organization of the U.S.A.F.**—Although the students will receive a more detailed description of the mission and organization of the U.S.A.F. in the school which they attend later on, a basic understanding of the U.S.A.F. is made available in this phase. In this phase the student is given an awareness of doctrine, mission, and organization of the U.S.A.F. through group discussion, speaking exercises and writing assignments. They are divided into three levels of language proficiency and the amount of information in this area is geared to his particular comprehension level.

2. **American-English Language.**—Most of the course time spent in the preparatory phase is devoted to improving their grasp of the English language, including Air Force slang and colloquialisms. Vocabulary is not taught directly but is increased as a by-product of his other activities. In a unique classroom he can listen to a "master" recording (through an individual tape recording and earphone device built into the desk in front of him) of his own voice (as well as experts' voices). A tape-recorded playback of his own voice, practice in individual writing, practising good pronunciation habits and typical American-English sentences are all part of the daily routine in helping the student to become better acquainted with our "Americanese." This training aids him later in getting along with his fellow American Air Force officer students and in understanding the lectures and reading material presented to them.

3. **Culture of the U.S.A.**—Integrated throughout the Preparatory Phase is a series of lectures, films, and discussions led by Air Command and Staff College Educational Specialists on significant areas of the American way of life. The purpose of this programme is to acquaint the Allied officers with the family, religious, educational, economic, military and government institutions in the United States. Additional current events discussion periods are scattered throughout the course. So that the student might better understand and appreciate, through personal observation, significant aspects of U.S.A.F. organization, procedures, equipment, and the inter-relationships of the various cultural institutions in our community, week-end field trips are organized to many of our larger cities. These trips are chaperoned by American Air Force officers and in the past have ranged from New York, Miami, and Washington to Los Angeles and Hollywood (where a typical movie studio was visited). In early September of 1954, a group of Allied officers toured Atlanta and the near-by B-47 jet bomber plant—the largest aircraft facility in the world. These field trips give the students an opportunity to practise listening to and speaking English in other than an academic situation, and to develop attitudes of inquisitiveness, co-operation, and flexibility.

During this phase a formal banquet is held on the base, in which the Allied officers are welcomed by the Commander of the Air University and the Mayor of Montgomery and the President of the local Chamber of Commerce. Each student is issued a copy of a handsome, embossed passport to Montgomery, each personally signed by the local dignitaries. This "passport" book contains the officer's picture, significant helpful information regarding tipping, mail, and tables of equivalent weights and measures in the U.S.A.

D. ALLIED AIR FORCE OFFICERS' CONTRIBUTIONS TO THE AIR UNIVERSITY

Once each class in the Squadron Officer School, the student Allied officers have an opportunity to be members of a panel discussion before their 750 fellow American officers. This Allied Officer Panel has a three-fold purpose. It first gives the Allied officers a chance to explain the high-lights of their home countries and their attitudes toward America. An opportunity is also given the U.S. officer students to better understand the feelings and nature of their Allied brothers. Thirdly, through the use of questions from the audience, a closer co-operative, friendly spirit is built up between the Allied officers and their American counterparts. This joint participation of Europe, America, Asia, and South America, not only in *living* together but in *learning* together in the same classrooms, has given rise to the term that the Squadron Officer School, the Command and Staff School, and the Academic Instructor Course of the A.C. & S.C., are like a "miniature" United Nations in their daily functioning with American and Allied officers sitting side by side solving joint problems.

One example of a mutual sharing, resulting from the *esprit de corps* engendered in the Squadron Officer School, was the sending of a beautiful tiger skin (the S.O.S. symbol) all the way from Thailand by an ex-Allied officer student on his return to his homeland. This student, Major Phayome YenSoodjai of the Royal Thai Air Force, dispatched the tiger skin in a gesture of mutual friendship through Colonel Dheb Kesmuti, another Thai officer who followed YenSoodjai to America. This gift is highly treasured by the students and faculty of the Squadron Officer School. Allied officers are asked to give lectures to the A.C. & S.C. faculty on their countries' socio-economic and military backgrounds. Wing Commander Aziz of Pakistan, a student in the Command and Staff School, had the honour of starting this programme of mutual understanding in October, 1954.

The feeling of "oneness" that the Allied officers soon obtain in their relationships with their colleague American fliers was never summed up in more apt terms than those of Captain Cengiz "Tex" Kutluoglu of Turkey, a student officer. He said, after being in the class one week, that he had already learned what it took to become a " real Tiger." He acquired his nickname of "Tex" on his last tour of duty in the United States as a student pilot. This ruddy faced young Turk, named for the great Jenghiz Khan, had in a few short weeks not only mastered Air Force slang but had gotten the feeling of the true Air Force tiger spirit as well.

This intangible sharing of the joint morale incentives has made an inseparable link of strong bonds between many of our American and Allied officers who some day may be flying and fighting together in a similar united organization to H. G. Wells' "Wings Over the World."

CITIES AS BATTLEFIELDS

By J. M. Spaight, C.B., C.B.E., LL.D.

CITIES AS BATTLEFIELDS

THE cities became battlefields in the Second World War. In the earlier war they had been the scene of some small encounters. In the second many of the bloodiest engagements of the war were staged in and over them. At Hamburg, at Dresden, at Tokyo, at Hiroshima and at Nagasaki the death roll was as great as or greater than that of any of the land battles. In these five cities alone some 400,000 people lay dead when the storm had passed. The count in a new war may be a more grievous one still. Cities of a million inhabitants or more may disappear from the earth with every living soul in them.

To those of us who have been students of air power since its earliest days this grim tale of slaughter past and forecast of worse to come has been a profound disappointment. We have always held that its function is to disarm, to destroy the weapons of war and the means of making war, not to kill men —and women and children. The air arm is inherently the least homicidal of the arms of war. It seems to be in danger of becoming the most homicidal.

The new weapons of mass destruction which are now available will be capable of causing human casualties far in excess of those suffered in any of the battles of the wars of 1914-18 and 1939-45. If they are used by the air arms, those arms will be partners in a tragedy which surpasses imagination. Timour and Jenghiz Khan will have been outclassed. Mass slaughter on a scale never witnessed on this earth will be seen if great centres of population are attacked with the new weapons from the air.

TOWNS UNPROFITABLE TARGETS

It is time to call a halt. Air power has started on a wrong road with a bad companion. Its association with nuclear weapons, if it uses them to bomb towns, may be a disastrous association for it. In time, one cannot doubt, those weapons will be prohibited. In the meantime, could not an instalment, so to speak, of the prohibition be accepted and the use of them against centres of population be dropped provisionally ? That would be a first step back to the right road. Air power could take it without sacrificing anything of its military effectiveness. It has far better objectives to attack. Cities are, on the whole, unprofitable targets. The Russians might fight on even if Moscow and Leningrad were atomized. They could fight no more if the Caucasian oil region were turned into a desert.

The argument for attacking towns is that, because the effect would be so catastrophic, it will avert war. It is for that reason that, as an American writer has said, the atomic bomb has been "almost deified" in the United States. "Some people have gone so far as to set it upon an altar and bow down to it as the existing symbol of divine protection."* Well and good; but what if it does not avert war? If it does not, we can only atomize the enemy's towns if he atomizes ours. That will be our "defence." We shall have armies, too, we and our allies, armies of many divisions and many nationalities, but what will be the value of them when the ever-leaping nuclear war is under way? An acute observer has asked: "What will a European army be worth if the peoples that are supposed to man it see themselves as sure candidates for incineration before or after United States retaliatory power has incinerated the Soviet population?"* That question goes to the root of the matter. What is in contemplation is not in fact defence; it is retaliation; and these two things are not the same. Retaliation is the old *lex talionis*. Defence is, or should be, protection from the stroke which has retaliation as its sequel.

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* J. E. Keiffer, *Strategy for Survival*, New York, 1953, p. 267.

A STRANGE CONCEPT OF DEFENCE

We of the free world all live, more or less, in Welfare States today. In such a State the Government exists for the sake of the community. To safeguard the community's welfare it is essential that the country's independence and free institutions should be preserved, and that must always be its rulers' first consideration. Of hardly secondary importance must be the protection of the people for whose sake they are responsible and of whom they are the guardians. "Who dies if England lives?" That is a great and noble thought, but it cannot be pressed to extremes. It will hold as an exhortation to the men and women who are free agents and able to take their share in the labours and risks of total war. They may be said to have counted the cost and accepted the challenge.

But what of the countless thousands who are wholly, and necessarily, passive? What, above all, of the children? "Sob-stuff," the cynics growl when one speaks of children in such a setting. It is not sob-stuff here. It is hard realism. Any nation that has regard for its future would wish to protect them: children, and nursing mothers, "useless mouths," as useless as the old, the infirm and helpless, yet precious in their promise. There is no justifiable conception of defence which would exclude them from its scope. Defence which puts them in the front of the battle, exposes them to annihilation in the interest, forsooth, of "national security," is a travesty of defence. They are the nation of tomorrow. Their survival is essential to the nation's survival. Tens of thousands of them are to be found in any large city, and there an overwhelming blow might fall on them before any scheme of evacuation could be put into operation. That is "defence," if you please, in these enlightened days.

PEACE THROUGH TERROR

The main argument for such a strategy is that, because unimaginable horror would come if war came, war will not come. The horror, therefore, will not come. It is a new and strange approach to the goal of world peace. The foundation of it is terror. Fear was one of the four ills from which mankind was to be set free in President Roosevelt's vision of the better age to come. In the new evangel that particular freedom finds no place. Rather, the denial of it is at the heart of the new cult. Fear, and fear alone, will save humanity from the age-long plague of international strife. Nations will live under a reign of terror, and air power will be the agent of the terror and the dispenser of it.

Has air power counted the cost? Does it want to be the instrument of terror? It should remember what is at stake, for that is nothing less than its own future. Already it has its enemies. They are not all faddists and pacifists, nor are they confined to "that strange little coterie of reactionaries and muddle-headed sentimentalists who regard the bomb as a slightly indecent and certainly immoral weapon," to quote Lord Tedder's words in the House of Lords on 17th March, 1954. They are many of them able and distinguished officers of the Services. There is no reason to think that they are all hidebound or suffering from occupational obsessions. And the repugnance to the use of nuclear weapons against centres of population is not a peculiar notion of theirs. It is widespread. As *The Times* said in a leading article on 31st July, 1954, "there is a strong cleavage of opinion about the practical value and moral justification of atomic bombing against strategic objectives."

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* Professor Robert Strausz-Hupe, "The Nuclear Backfire," in *Air University Quarterly Review*, Spring, 1954, p. 41.

AIR POWER IN DANGER

A little earlier the same newspaper stated in a leader on 10th June, 1954, that bombing which is capable of deterring global aggression may have the effect of increasing the frequency of local wars. "Is it impossible," the paper asked, "that in the process they"—the bombers—"may end by sounding the knell of air attack altogether, even of the tactical kind?" Soon, it said, almost every aircraft will be potentially the carrier of a weapon of mass destruction, and the use of such weapons may result in the converting of local wars into global conflicts. Fear of such a result may lead to the exclusion of air forces from the Korea-type war, until they are "relegated one day to the role of Household troops."

"What an absurd idea!" some will say. Is it really so absurd? Those who think that it is should remember what happened in 1933, when nine and a half million people in this country answered "Yes" in the notorious Peace Ballot to the question: "Are you in favour of an all-round abolition of national military and naval aircraft by international agreement?" A little over one and a half million voted "No." They should remember, too, that a year or so before then an agreement to ban bombing altogether was discussed and very nearly accepted at a full-scale international conference. The wind may set in the same quarter again. The case for such a ban will be the stronger if bombers are to use the new arms of mass destruction. Those of us who opposed the ban then, and would still oppose it if it applied to conventional weapons, will find it harder to reconcile opposition with our consciences if it means perpetuation of the use of the new weapons of terror. All those who are true friends of air power would do well to remember the old and still valid advice about the half loaf. It will be wiser to rest content with the kind of bombing which need not outrage humanity.

CITIES CANNOT BE NEUTRALIZED

There are some who would go farther and would ban all strategic bombing of populated centres. "I believe," Sir George Thomson has said, "that we ought not to bomb cities, either by atomic bombs, or by ordinary explosives, or by incendiaries." If we did not, he thinks, the Russians would also refrain from bombing cities.* So, probably, would other belligerents. The result would be the *de facto* neutralization of cities. The question would remain, however, whether circumstances might not make imperative the bombing of a particularly important military objective within a city's bounds, and if the attack were made with precision, as it could be if ordinary bombs were used, the belligerent ordering the attack could show a case for it on the score of military necessity. There could be no precision if nuclear weapons were used. Bombing with them cannot but be indiscriminate. Any attempt to bomb individual targets is out of the question.

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* Lecture on "Atomic Energy and Moral Issues" in *Atomic Energy: A Survey*, edited by Professor J. Roblat, 1954, p. 67.

It would be wiser, for the present, to limit any ban upon attacks on towns to atomic attacks and not to extend it to ordinary bombing. That is indeed the suggestion of a distinguished atomic scientist, Dr. P. E. Hodgson; his proposal is that "all nations pledge themselves never to use it"—the atom bomb—"on inhabited cities."[*] Another, an American, has proposed that the first use of atomic or hydrogen bombs against civilian populations should be renounced altogether, though they could still be dropped on armies, navies, airfields, transportation facilities and oil wells.[†] It would probably suffice if, in the event of war, each belligerent issued a disclaimer of any intention to use atomic bombs against towns, more or less on the lines of the disclaimers by the belligerents in September, 1939, of an intention to use poison gas. The guarantee for the observance of this declaration would be the manifest advantage to each side of strict compliance with it. It would be observed not only for humanitarian reasons but because far more profitable targets could be found elsewhere. "I believe," said Mr. Churchill as long ago as 16th November, 1937, in the House of Commons, and what he said then is as true today, "that there is no doubt that if one side in an equal war endeavours to cow and kill the civil population, and the other attacks steadily the military objectives, the focal points on which the opponent's war-making capacity depends, victory will come to the side, all other things being equal, which avoids the horror of making war on the helpless and the weak." It is possible, indeed, that without any undertaking belligerents may abstain from bombing one another's cities. "A tacit convention may establish itself, founded on the reciprocal interest of the adversaries in avoiding certain destructions such as those of populous centres."[‡]

ATTACK ON MORALE

The possible objections to such a plan are two; neither is, if examined, of very much weight. The first is that it would deprive the belligerent who was stronger in the air and in stocks of the new weapons of a definite military advantage, namely, his power to weaken his enemy's morale in the most effective way, which would be by attacking his large centres of population. It might, indeed, be possible, some think, to decide a war in record time in such a way. There is here a revival of Douhet's doctrine, that we should "hammer the nation itself to make it give in." "It will be an inhuman, an atrocious, performance," he said, "but these are the facts."[§] Are they in truth the facts? Douhet's theories were discredited to a large extent in the last war. The country which has the bigger airfleet and the bigger stock-pile of bombs may be less favourably situated and more vulnerable than the enemy country. The latter may have the advantage of great spaces and widely dispersed agglomerations. And the enemy might strike first. Much would depend on which side "beats the other to it." In any case, even a small number of the new weapons might cause appalling damage. As Mr. Churchill said in the House of Commons on 28th March, 1950, "The United States might have 1,000 atom bombs and Russia 50, but if we got those 50, fearful experiences far beyond anything we had ever endured would be our lot."

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[*] *Atomic Scientists' News*, May, 1953, p. 312.

[†] W. L. Lawrence, *The Hell Bomb*, 1951, p. 105.

[‡] Général Audet, *Conséquences des progrès de l'armement*, in ***Review de Défense National***, October, 1954, p. 266.

[§] Giulie Douhet, *The Command of the Air*, (1928), translated by Dino Ferrari, 1942, pp. 185, 201.

WAR IN ENEMY AIR

The other possible objection referred to above is that the threat to the cities has the effect of tying down substantial defensive forces in the homeland for their protection, that it keeps the air war over the enemy country, and that it relieves our own country *pro tanto* by making the enemy too busy in defending his own to have the time or the forces to attack us at home. That certainly happened in the last war. Germany had to devote a disproportionate share of her aeronautical production to building fighters and had less available for building bombers, and we benefited accordingly. In 1939 43 per cent. of the Luftwaffe was composed of fighters; in 1944 the figure had become 66 per cent.* Abstention from atomic raids on towns will not, however, make much difference in this respect. The towns, or rather military objectives in them, will still be liable to be attacked with conventional bombs, and will have to be defended, as in the last war, in the air. To that limited extent they will be battlefields still. More air forces will be needed to protect the many non-urban objectives which might be attacked with atomic or other bombs. Such objectives will be, as already stated, the most paying and most probable objectives of all, and will therefore have to be powerfully defended.

TACTICAL NUCLEAR OPERATIONS

The towns may benefit, too, from another development. This is the application of nuclear weapons to tactical operations. Such weapons will be needed in great quantities by the western Allies if, as may well happen, the next war takes the form of a clash between the massive armies of the east and the smaller but more powerfully equipped forces of the west. It was that situation which, in all probability, Field-Marshal Lord Montgomery had in mind when he made his much criticized statement in his address at the Royal United Service Institution on 21st October, 1954, when he said that S.H.A.P.E. was planning to use atomic weapons for defence. He cannot have been referring to strategic use of them, for that is a question for political decisions by the several governments of the N.A.T.O. countries. He must have been referring to tactical use, and that this was so is supported by what his chief, General Gruenther, said in an address at County Hall in London on 5th April, 1954. "Our basic strategy is to make a shield," he said, "so strong that it requires the enemy to concentrate if he is going to penetrate, and when he concentrates we use the devastating power of the atomic bomb." There is, in fact, a good deal of evidence of a shift of emphasis from the strategic to the tactical use of the new weapons. It is to be seen in the character of the atomic tests carried out by the United States in Nevada and at Eniwetok in the years 1951—1953. Mr. Gordon Dean, the former chairman of the United States Atomic Energy Commission, has drawn attention to this development and the implications of it. He has said: "The mass killing of millions of women and children and the fear of retaliation in kind is, in my view, what causes most people to be more revolted and horrified by the thought of atomic warfare than they apparently are by the thought of warfare *per se*. But none of these things would appear to apply to the use of atomic weapons against troops.†

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* Gen. von Rohden, quoted by Capitaine J. Bertin, in *Forces Aériennes Françaises*, August, 1952, p. 702.

† *Report on the Atom*, 1954, p. 112.

ELIMINATION OF NUCLEAR WEAPONS

The plan here suggested, that nuclear weapons should not be used in attacks on cities, is, it must be emphasized, only an *ad interim* one. It would no longer be needed if such weapons were eliminated from national armaments in accordance with the decision of the General Assembly of the United Nations in January, 1946. There are some who would say: "Oh, the whole situation has changed since then. Nuclear weapons have come to stay. They have established themselves and cannot now be prohibited." Views of this kind are frequently expressed by spokesmen of the American air service. A statement of policy drawn up by the United States Air Force Association, for instance, at its meeting in Omaha on 21st August, 1954, declared *inter alia*: "We believe that our national policy must clearly define nuclear weapons as legitimate and conventional instruments for resisting aggression, or the Air Force's temporary advantage in weapons technology will continue to be seriously compromised." That the reference to resistance to aggression was not meant to be tactical only was shown by the further statement: "We believe it is the direct interest of our national survival to attack the basic sources of military strength behind any future Communist aggression."* It would be difficult, however, for the United Nations now to reverse the decision which they reached and solemnly put on record in 1946, and that that decision still stands has been affirmed by British and United States statesmen. Meanwhile, the suggestion made in the present paper may be worthy of consideration. It would not be put forward if it were calculated, in the writer's opinion, to clip the wings of air power. On the contrary, its effect should be to make the air arm more potentially decisive than ever; and it should serve our broad national interests too. There is no doubt that our towns are more vulnerable than those of our foreseeable enemy. We are less favourably situated in this respect than the Russians, and for that matter than the Americans. "On balance," it has been shrewdly said, "the military use of the atomic bomb would in a short decisive struggle be more favourable to the Soviet Union, or to the United States of America, which have vast areas for dispersal, than it would be to countries with industries and populations more densely concentrated. We are one of these."† At the meeting in Paris on 17th—18th December, 1954, of the Foreign and Defence Ministers of the fourteen countries of the Atlantic alliance it was agreed that whether nuclear weapons should be used in the event of war was a matter for decision by the N.A.T.O. Governments and not for S.H.A.P.E. There would be nothing to prevent those Governments from ruling that such weapons should not be used against towns. The enemy would follow this lead in all probability. It is unlikely that the American-based Strategic Air Force would take a different line. As Mr. Dulles pointed out at his Press conference on 21st December, 1954, the question whether atomic weapons should be used was one for decision by the civil and not the military authorities in the United States as in other countries, and his statement as a whole indicated that the decision would have regard to the great difference which he said existed between strategical and tactical use.

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* Quoted in *Air Force*, Oct., 1954, p. 21.

† Ian Harvey, M.P., *Arms and To-morrow*, 1954, p. 22.

EARLY DAYS AT CRANWELL

By AIR VICE-MARSHAL C. L. M. BROWN, C.B., O.B.E., M.A., A.D.C.

CRANWELL has stood as a Station since, I suppose, the very earliest days of the Royal Air Force and it has become the repository, the guardian and the perpetual fountain of R.A.F. tradition. Together with Halton it has a special place in the peace-time life of the Service, as without these two great training stations the Air Force would seem to lose something of the little that is fundamental and permanent in its structure. For although in general the exigencies of administrative convenience govern our doings to an alarming extent, so that we think less than nothing of plucking up our Service schools and training establishments by the roots, on the slightest of pretexts, and depositing them here, there or anywhere within a radius of a few hundred miles with a frequency and an airy nonchalance that one cannot fail to admire, no one for a very long time has thought or dared to move either Cranwell or Halton, which accordingly remain, as I have said monuments of stability and permanence in the kaleidoscopic merry-go-round of the R.A.F. world.

Cranwell for much of the 1914-18 war had been a station of the Royal Naval Air Service; and those of us who had occasion to pass up and down the North Sea at that time will remember the dirigible airships which were accustomed to cruise calmly overhead on submarine patrol and which, one later realized, had their base at Cranwell. When I was first posted to the station in 1922 a great airship hangar stood, a sombre and deserted mastodon of a structure, in the north purlieus of the camp where officers' married quarters now beautify the heath. Like the hangar at Cardington, it was a landmark for miles around, a function since taken over by the central dome or pinnacle of the R.A.F. College. For the College, as a material structure, did not exist in 1922, nor for many years afterwards. At length, after the customary procrastinations and disappointed expectations (building was always, according to rumour, going to begin "next term"), the present admirable College arose, which so many generations of flight cadets have cherished as their first R.A.F. abode. Coming from Newark, as one surmounts the Jurassic Ridge at Caythorpe, the distant dome of the College catches and holds the eye, brooding a little incongruously over the west Lincolnshire wastes. The circumstance that this, the premier military academy of the Royal Air Force, was constructed without any classrooms may have been an oversight or, one would like to think, a defiant gesture against the well-known incubus of education.

Apart from the old airship hangar, the College building itself, and some characteristic R.A.F. hutted architecture in East Camp dating from the comparatively late period of the 1939-45 war, Cranwell has changed singularly little under the burden of the last thirty years. Along the road which runs through the middle of the camp, with its avenue of stately beech trees, the same groups of people are standing to mount much the same buses, and the very same cyclists are driving forward from Cranwell village, heads low over their handlebars as they contend against the same westerly gale. It needs nothing more than the slightly drooping, slightly pessimistic figure of Captain Brachi in his old fishing hat and with a satchel of books over his shoulder trudging down from the temporary College to catch the old Works and Buildings train that ran thrice daily from Sleaford to East Camp to make the illusion of the years complete.

Cranwell was not then a part of any Command (or Area, as the Command formations were first called) and acknowledged no superior, with the possible exception of the Air Ministry, vaguely understood to have a mythical existence somewhere in or about London and to be a pseudonym for Sir Hugh Trenchard. Sir Charles Longcroft, lanky and hawk-like of eye, was A.O.C., and after him Air Vice-Marshal Borton; and the assistant Commandant of the "Cadet College" was Group Captain L. W. B. Rees, V.C. Though officially I knew him only at a distance, this officer made a notable impression upon me. He did not, I think I may properly say, conform quite to the pattern of the R.A.F. officer of his time. There was about him an underlying gravity, a seriousness, and his courteous bearing brought to mind the word-picture of Chaucer's "parfit gentil knight." In dealing with offenders, however, gentle was not perhaps the word that would first come to one's mind.

Inspired maybe by the example of H. A. Cox, the Senior Education Officer of the Apprentice Wing and champion toxophilite of Great Britain and Ireland, Group Captain Rees took up the practice of archery and, dissatisfied with inanimate targets, was accustomed in the autumn evenings (so it was told) to quarter the aerodrome, starting the numerous hares which frequented it and seeking to transfix them with a well-aimed shaft. I do not believe that by this means he caused any serious shortage of quarry for the original Cranwell Beagles which, under the mastership of Professor Rupert de la Bere, provided us with sport and exercise on Wednesday afternoons, one and all (as *Punch* observed)

"Determined, if they cannot kill,
At least they'll strive with main and might
To give their hare a nasty fright."

To say that there were great men abroad in those days is little more than an historical platitude, for when have there not been great men at Cranwell? But not in every decade has Cranwell harboured as great a celebrity as Colonel T. E. Lawrence, in the guise, if not for long the disguise, of Aircraftman Shaw. Colonel Lawrence's career in the first war and immediately afterwards was sufficiently sensational viewed in the sober light of reality, but at that date, before the publication of *Revolt in the Desert*, truth, legend and journalistic exaggeration were so inextricably mixed that in the popular mind he figured more as some fabulous character from the *Arabian Nights* than as a creature of common flesh and blood. Small wonder that at first we scoffed at the whispered rumours that went around. Nevertheless the incredible for once proved to be the truth, and before long the ruddy-cheeked boyish figure of Aircraftman Shaw, on his motor-cycle, became a not unfamiliar sight in the lanes around the Camp.

Contemporaneously the Apprentice Wing contained a small, merry-faced smiling boy, generally with a smudge on the side of his nose, who was shortly to take the first and perhaps decisive step of his great career by winning a cadetship to the College. This, I need scarcely say, was Aircraft Apprentice Whittle, whose scientific brilliance was so far known only to two or three Education Officers.

Of the incidents, that occurred at Cranwell one has remained indelibly imprinted on my memory. It is a rugger match, Cranwell *v.* Sandhurst, and from a comparison of struggling figures the giant shape of Flight Cadet Beamish emerges and roars over the line for the winning try, three Sandhurst pygmies clinging vainly to various parts of his person. That was the first rugger victory registered by Cranwell over Sandhurst and on the touch-line Squadron Leaders wept for joy.

Memory indeed fashions a frieze of once-familiar characters moving across the scene who in their several ways, large or small, contributed something to the composite personality of Cranwell of the early twenties. The sturdy, good-natured form of Professor Oliver Sinnatt; Daddy Dawes, the genial ex-Guardsman; D. R. Pobjoy and Nicholas Comper, already collaborating in the production of one of the earliest light aeroplanes; Tim Healy, the accountant, jauntily potting the black in the Mess before lunch; W. H. Pick, the Met. man and wizard of the ping-pong table; these and many others played their part on the Cranwell stage and went their ways.

The great thing was that Cranwell, indeed the whole Air Force, was young then, and not yet (so it seems in retrospect) encumbered by the routine and red tape that inevitably wind themselves about a full-grown Service, like ivy round a tree in its maturity. It was only a few years, indeed, since the R.A.F. had secured its independence from the tutelage of the two older Services, and like a young man leaving home it had its own way to make in the world. If it did not securely establish its position, there stood its two dispossessed parents only too ready to tear it lovingly in twain and welcome it back to their eager embraces. Everyone seemed to realize this, and perhaps as a result our voices were a little strident and our claims, at least to other ears than our own, a little inordinate. After all, the Battle of Britain and the 1,000 Bomber Raid were events of the remote future, and indeed the very concept of Air Power itself was only a stripling upstart whose very existence was called in question. From the first, Cranwell stood unequivocally for the Air, and confidently believed herself to be the standard-bearer of the future.

As Lawrence said in a letter to a friend : "Cranwell was a happy place."

[*Air Ministry Photo*

NO. 600 (CITY OF LONDON) SQUADRON

Squadron-Leader J. M. Cormack, Flight-Lieutenant M. Oliver and Flying-Officer K. Burvill, diving three Meteor 8's of No. 600 (City of London) Squadron towards earth, on completion of a formation loop while rehearsing their item for the Battle of Britain "At Home" Display.

THE FUTURE OF THE ROYAL AUXILIARY AIR FORCE

By John W. R. Taylor

On 1st December, 1954, the Minister of Defence made a statement in the House of Commons concerning the future of the Royal Auxiliary Air Force. It left members of the twenty Auxiliary fighter squadrons in little doubt that their ultimate fate would be similar to that of the R.A.F.V.R. units, which have been disbanded, with the exception of the University Air Squadrons.

Inevitably, the statement was received with mingled surprise, dismay and indignation by the Auxiliaries and the Press. And although the changes it proposed have since been superseded by a more realistic and satisfactory plan, there is much to be gained by studying both the reasons for the original proposal and the future prospects for the Royal Auxiliary Air Force.

The statement of 1st December claimed that problems of organization and equipment of the Royal Auxiliary Air Force had been intensified by the introduction of swept-wing fighters and the growing complexity of the air defences of the country. As a result, the Government had decided to alter the organization of the Royal Auxiliary Air Force in such a way as to enable auxiliary pilots to train on the swept-wing aircraft themselves, as individuals, but not to re-equip auxiliary squadrons with them. Each squadron was to be linked with a regular squadron, and auxiliary pilots would fly the aircraft of the regular squadrons. By this means they would provide reserves behind the regular squadrons in war.

That, in essence, was the original plan. It was repeated in a little more detail by the Secretary of State for Air, who gave the impression that he would rather have said nothing until he had had more time to think about it. Unfortunately, nothing concrete was said to the auxiliaries themselves, and the general interpretation of the statement was that the number of aircraft provided for each squadron was to be reduced to four, and that these would be available only to men under 25 years of age.

Little wonder that many of the most keen and highly skilled pilots and ground crew remarked that they would rather see the Royal Auxiliary Air Force disbanded completely and proudly, with its colours flying, than to fade away miserably to a pale undistinguished shadow under the wing of regular squadrons. The prospect of having to approach the C.O. of a regular squadron, cap in hand, to ask if they could borrow some of his fighters for the day appealed to none of them; and could hardly be more popular with the regulars, who have to maintain their units at full fighting efficiency every day of every week.

Most of all, the auxiliaries resented the statements that they could not cope with the new generation of swept-wing, supersonic fighters represented by the Hawker Hunter. With good reason, for many of them knew it was once considered that D.H.9A's were too advanced for auxiliary pilots to handle.

Yet the first four squadrons brought into being thirty years ago by Marshal of the Royal Air Force Lord Trenchard quickly proved themselves so efficient that by 1939 the Royal Auxiliary Air Force had grown into a *corps d'élite* of twenty squadrons. Indeed, it was as a result of their achievements that the Air Ministry called into being in 1937 the R.A.F.V.R., to provide a further

["Flight" Photo

VOLUNTEERS FOR DEFENCE

"Good Types" such as these are ready to defend Britain should the need arise. Members of No. 500 *(County of Kent) Squadron, Royal Auxiliary Air Force. Ex-Momentum, detached for exercise from our base at West Malling, August,* 1953.

large reserve of pilots, drawn this time from the industrial areas and "the whole range of secondary school output," rather than from the County Associations.

There is no need to recount the contribution to victory in World War II made by the young men of both reserves. The first German aircraft destroyed over British soil since 1918—two Heinkel He.III bombers—were shot down by members of No. 602 (City of Glasgow) and No. 603 (City of Edinburgh) Auxiliary squadrons on 16th October, 1939. And a large proportion of the thousand British pilots who saved Britain and the world in the summer of 1940 were members of auxiliary squadrons.

They were not found wanting in skill and spirit, although their Hurricanes and Spitfires were incomparably more complex than the aircraft that equipped the most favoured regular squadrons four years earlier. And when the time came to advance from Spitfires on to Meteor jet fighters, the pilots and ground crews of the post-war auxiliary squadrons took the change-over in their stride. It is inconceivable that the transition from Meteor to Hunter would be beyond the capabilities of such men, especially when almost everyone with a radio or television set will have heard members of Fighter Command's first Hunter squadrons explaining what pleasant, easy machines they are to fly.

Nor are the post-war auxiliaries merely good, keen pilots. During air exercises they operate alongside, and under the same conditions as the regular squadrons, under the guidance of their own fighter controllers. Some also achieve practice gunnery averages as high or higher than many regular squadrons.

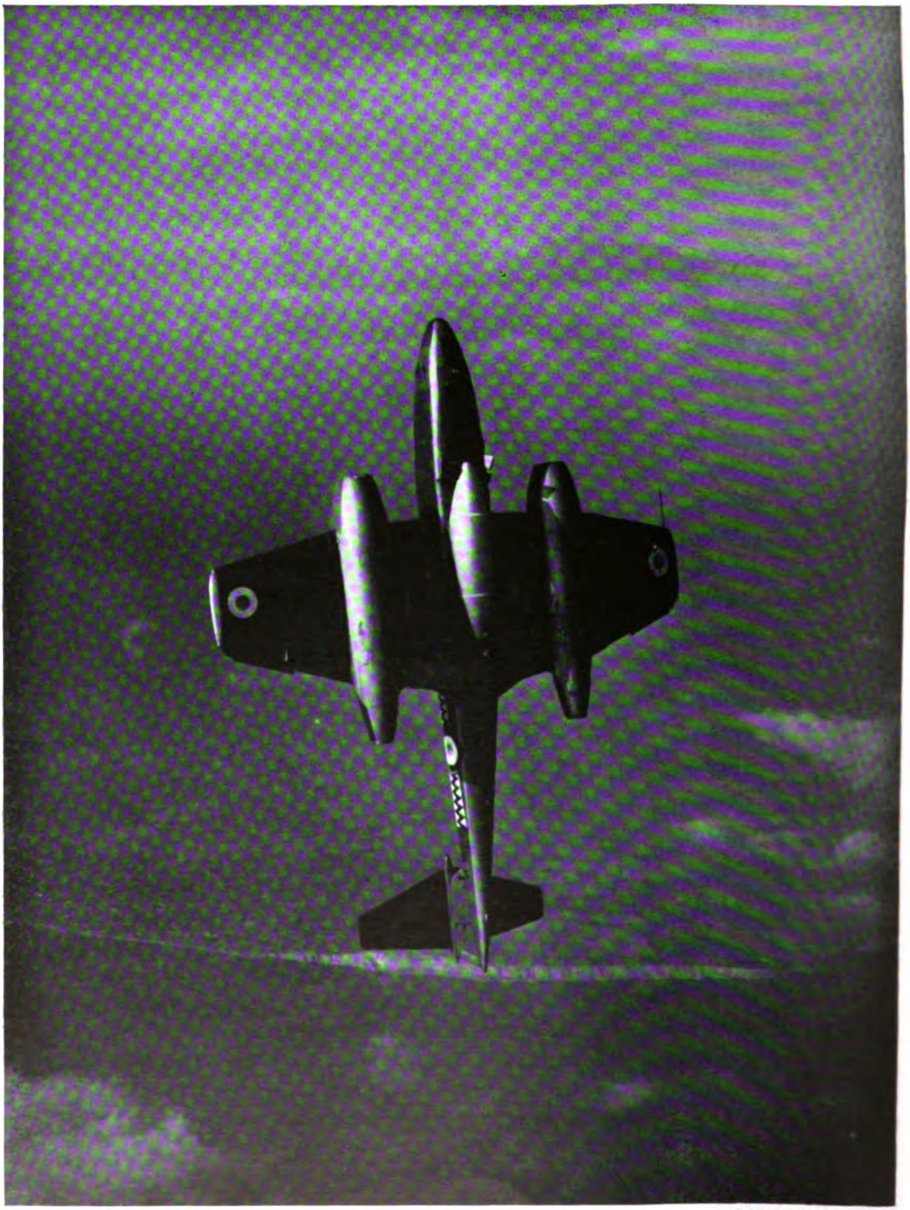
Knowing all this, members of auxiliary squadrons began to realize that the real reason for the proposed reorganization was financial rather than technical.

This was easier to understand; because a Hunter costs three or four times as much as a Meteor F.Mk.8, and it would be reasonable for a chairborne planner in Whitehall to be horrified at the prospect of entrusting such a delicate, expensive piece of ironmongery to a week-end flier.

The Air Ministry had made no bones about the demise of the Volunteer Reserve Squadrons. They were disbanded "for reasons of economy," and it seemed equally probable that the Royal Auxiliary Air Force was really to be choked to death slowly for the same reasons.

It is not easy to estimate what the auxiliary fighter squadrons cost the taxpayer in terms of pounds, shillings and pence. Annex II of the 1955 "Statement on Defence" gives the figure of £2.8 million for the "Pay &c., of Reserve, Territorial and Auxiliary Forces and grants for administration, &c." under the Air Ministry heading. But this includes 2,036 members of the Women's Royal Auxiliary Air Force; 10,903 members of the R.A.F.V.R., 388 members of the Women's R.A.F.V.R. and 136,314 members of the Royal Air Force Reserve of Officers (N.S.) and Class H of the Air Force Reserve, as well as the 6,405 members of all branches of the Royal Auxiliary Air Force. And it does not presumably cover the cost of aircraft, fuel and similar major items.

But how can we put a price on the value of those twenty auxiliary squadrons? What were they worth to us in the summer of 1940? What might they be worth to us in any future atomic war, when every bomber that eludes our defences can carry the means to rub London, or Manchester, or anywhere else off the map? Are they not worth each year the price of ten air liners that



[*Air Ministry Photo*

NO. 615 (COUNTY OF SURREY) SQUADRON

Flying Officer Hugh C. H. Merewether, of No. 615 (County of Surrey) Squadron, Royal Auxiliary Air Force, flying his Meteor 8 in a vertical climb over the English Channel while rehearsing an aerobatic item for the Battle of Britain "At Home" Display.

B.O.A.C. is to be allowed to buy from America?—or one-hundredth of the sum that British Railways plan to spend on their modernization programme? or even ten shillings a head from all of the men, women and children for whose protection they give their few leisure hours and, sometimes, their lives.

Not all squadrons are, of course, as efficient as some of those in the Metropolitan Area. This implies no criticism of the provincial squadrons, but is merely a statement of fact. So it was suggested by some people soon after the statement of 1st December that it would be better to reduce the number of squadrons rather than to cut back to a token unit the strength of every squadron.

Yet this was hardly satisfactory. Local pride would have been hurt and, justifiably, the pilots who were axed would have considered it a poor return for years of effort that had brought little reward but a chance to fly and a feeling of "doing one's bit" for the old country.

What were the alternatives? A change of role, in the same way that Auxiliary Squadrons of the R.A.F. Regiment had been switched from anti-aircraft duties to airfield defence? If so, to what?

One possibility was to re-form the auxiliaries as transport squadrons. Yet the experimental formation of No. 622 Transport Squadron had not, apparently, been considered a success. The idea of forming such squadrons with the personnel of independent airline companies had been a promising one; and the crews of No. 622 are convinced that it paid for itself while it was in existence. But it has now been disbanded; and if a transport squadron composed of skilled transport aircrews and ground staff was not considered worth-while, how much less practicable would be transport squadrons staffed by personnel of the present auxiliary squadrons?

The number of pilots would have to be reduced from eighteen to about six. Signallers and engineers would have to be called in. The squadrons would have to leave their present stations and perhaps travel miles away to new ones. And how often would it be possible to arrange troop or supply movements so that they could be carried out between Friday and Sunday evenings?

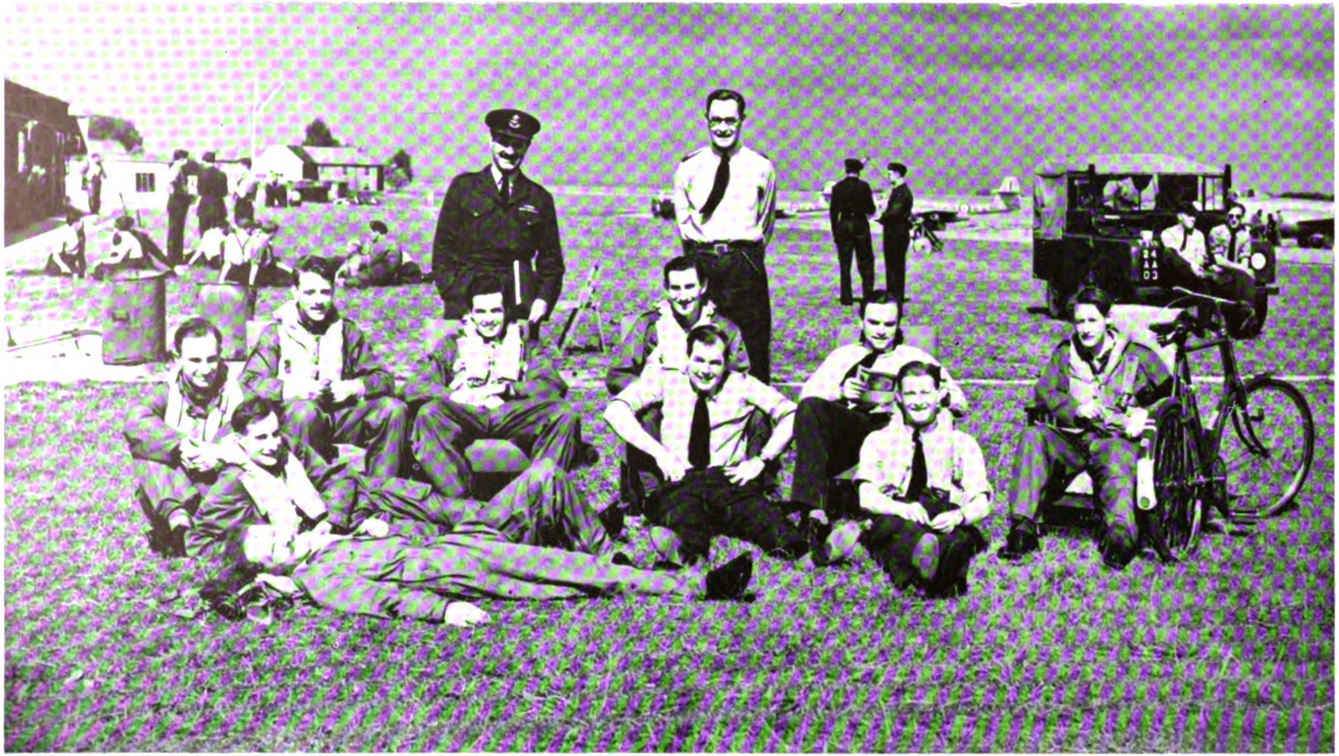
In short, transport squadrons were out. And most of the reasons why they were out applied equally to the suggestion of equipping the auxiliaries with easy-to-fly and easy-to-maintain Seamews for coastal reconnaissance and mine-watching.

So, it was a matter of retaining the auxiliaries as fighter squadrons or disbanding them completely.

Had an aircraft like the Folland Gnat been available in numbers *now*, it might have provided a solution to the problem. Easy to fly, powerfully armed, offering high performance, and yet costing only one-third as much as a Hunter, it would have enabled the auxiliaries to be equipped with interceptors of first-line quality at comparatively low cost. But not even a prototype Gnat has yet flown.

So the future looked very gloomy for the Royal Auxiliary Air Force, and for all those who felt that Britain could not afford to lose twenty squadrons of keen volunteer pilots at the present time. It was no consolation that a handful of youngsters from each squadron would be able to make occasional practice flights on Hunters belonging to regular units; because an auxiliary squadron is an entity, and to cut it down to pilots under 25 years of age or to only four aircraft would rapidly lead to its extinction.

In any case, the Korean War had tended to prove that it is the older, more experienced pilots—often in their 30's—who are the most successful in combat



["*Flight*" Photo

ANOTHER GROUP OF "SPARE-TIME FIGHTERS"

Some of No. 600 (*City of London*) *Squadron, Royal Auxiliary Air Force. Ex-Momentum, waiting for a "Scramble."*

Standing.—F./Offr. Roberts Arnold (Accts.); F./Lt. M. Maxwell (Equipt.).

Sitting.—F./Offr. J. Miles; F./Offr. C. M. Lambert; S./Ldr. J. R. Cormack (Sqdn.Cmdr.); Ft./Lt. Williams; F./Offr. F. Clarke; F./Lt. Reckitt; F./Offr. K. Burvill; F./Offr. M. Bridge (Since killed in Meteor).

Lying (*rear*).—F./Offr. J. A. Simpson; (*front*) F./Offr. J. Snook.

and the most prized for their leadership. Now we know that the Air Ministry is not unaware of all these arguments; because the *Memorandum by the Secretary of State for Air to accompany the Air Estimates*, 1955-56, contains the following paragraphs:

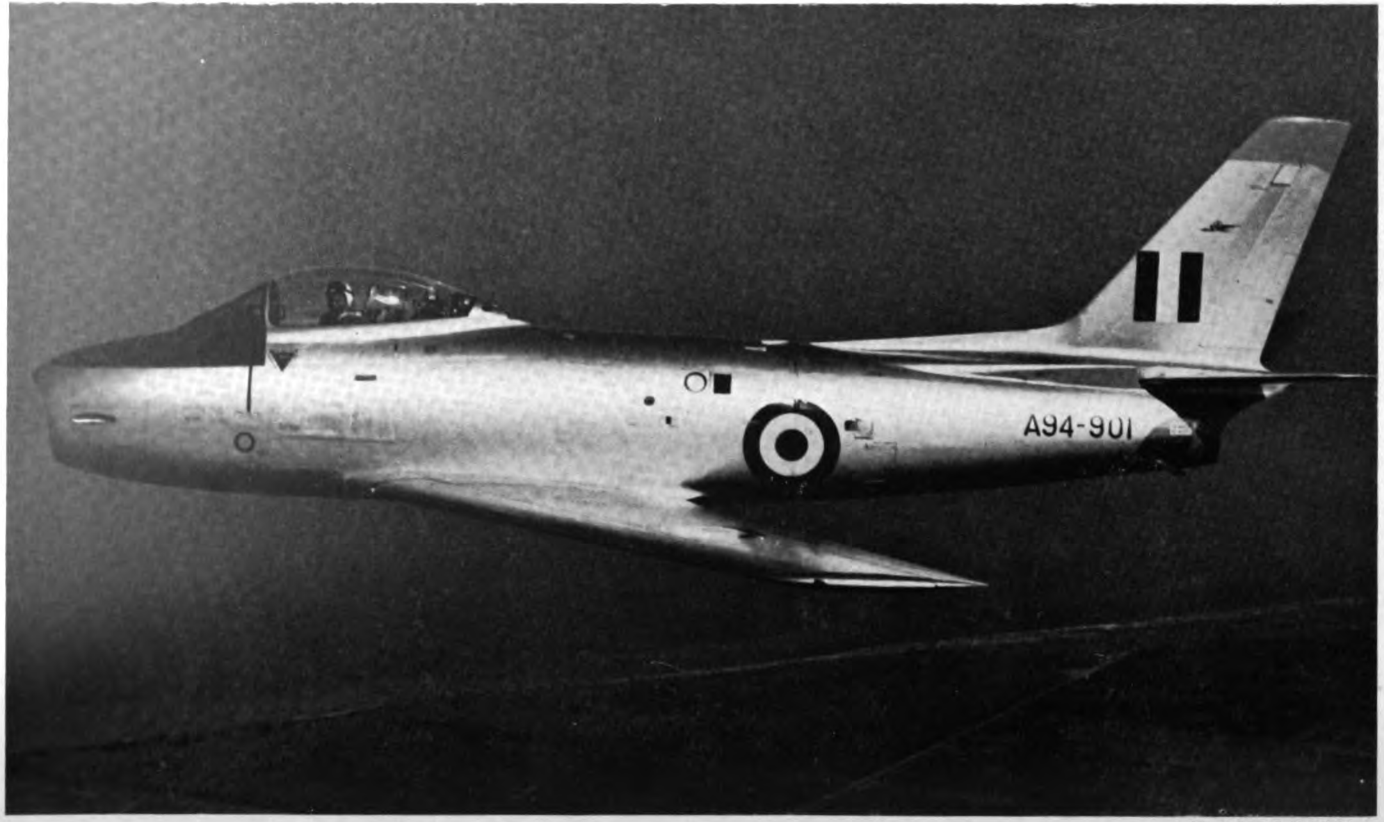
"As announced during the past year, plans were put in hand for adapting the organization of the flying squadrons of the Royal Auxiliary Air Force to meet the new conditions. The scheme which has evolved is different from that which was provisionally notified in the debate on the Address in one important respect. As announced, each squadron will be linked with a regular fighter squadron, and pilots who have the requisite experience and aptitude will be given the opportunity to train on the high-performance aircraft with which the associated squadron is equipped. They will thus be able to provide an immediate reserve of individual pilots behind their regular squadrons and so contribute to defence against the high-altitude nuclear threat.

"But in addition it is now proposed that Auxiliary Squadrons should retain their full establishment of Meteor and Vampire aircraft, besides the training flight, and continue to supplement as fighting units the defence against those other forms of air attack which may constitute a serious threat to this country. This arrangement, which makes the best use of our resources under the new conditions, will be reviewed from time to time in relation to the threat."

At the moment we can only guess what is meant by " those other forms of air attack which may constitute a serious threat." It seems probable that they include raids by high-speed, low-flying jet fighters and bombers, carrying nuclear and conventional weapons. If so, the 20 squadrons of the Royal Auxiliary Air Force, in co-operation with those other volunteers of the Royal Observer Corps, may have been handed their most important and toughest assignment yet. For the problem of intercepting these hedge-hopping "Rats" is hardly less difficult than trying to find high-flying bombers by radar in the rarified air and indigo sky above 50,000 ft.

If this is to be the future role of the auxiliaries, however, the problem of re-equipment is still acute, for the finest pilots in the world could not catch a "Rats" MiG-15 or Il-28 in a Meteor F.8 or Vampire. Perhaps the auxiliary squadrons could be given the Swifts that are still on order; or, even now, it might be worth while to put the Gnat in production for this vital job.

There are still a lot of "ifs" and "buts"; yet one thing is certain. If the squadrons of the Royal Auxiliary Air Force ever again have to fire their guns in anger, they will acquit themselves as gallantly and successfully as did their predecessors in the Battle of Britain.



[R.A.A.F. Official Photo

The first production model of the Avon-Sabre to be delivered to the R.A.A.F. by the Commonwealth Aircraft Corporation, is pictured flying above the Laverton area. At the controls is F./Lt. T. Berry, a test pilot of the Aircraft Research and Development Unit of the R.A.A.F.

ROYAL AUSTRALIAN AIR FORCE

R.A.A.F.'S FIGHTER SQUADRONS ARE HOME

FOR the first time since the Second World War, the R.A.A.F.'s fighter force is on home territory.

Millions of Australians saw the famous No. 77 Squadron's Korea-tested Meteor jet fighters during their recent tour of Australia, also No. 75 and No. 76 Squadrons return from more than two and a half years in Malta.

These three squadrons form the R.A.A.F.'s fighter formation—No. 78 Fighter Wing, to be based at Williamtown. They will be re-equipped with Avon-Sabre jet fighters from the Commonwealth Aircraft Factory. When this re-equipment is completed—probably by the end of 1956—the R.A.A.F. will have one of the finest jet-fighter forces in the world—small, but finely equipped and highly trained.

No. 78 Wing will have tremendous international experience to draw on. No. 77 fought in the Korean War as part of the United States Air Force's Fifth Air Force both in air combat with Russian-built jets and in ground attack missions.

No. 75 and No. 76 Squadrons, with No. 78 Wing Headquarters in Malta, did not see actual combat in the Mediterranean. But for the Wing's senior officers and pilots, Malta duty has been a post-graduate course in flying and aerial strategy.

Most of the R.A.A.F. pilots in Malta had completed an operational tour in Mustangs or Meteors with No. 77 in Korea. Several were Second World War veterans of battles against the Luftwaffe, the Regia Aeronautica and the Japanese Air Forces. In Korea they had taken a gunsight view of the latest Communist battle techniques.

Their Malta assignment was to increase their repertoire of fighter tactics by studying the methods used by the R.A.F., the U.S.A.F. and other Air Forces under the North Atlantic Treaty Organization.

On Malta, the pilots and the ground staff members of the R.A.A.F. Wing were given ideal conditions to make such a study. The island is in the middle of the Mediterranean and therefore is the key base in the N.A.T.O. Mediterranean Command. As the R.A.A.F. Wing was the only jet-fighter unit on Malta, it was employed as the island's main defence force during numerous N.A.T.O., Royal Navy and R.A.F. aerial exercises. Each of these exercises, which occurred on the average of once a month, was on a larger scale than the usual type aerial exercise seen in Australia.

Enemy air raiders, which attacked Malta from all directions, came from the United States Sixth Fleet, the U.S.A.F. in Libya, R.A.F. Bomber Command, the Royal Navy, the French Air Force in North Africa, the Italian Air Force and elements of the Greek and Turkish Air Forces.

From first light until dusk during these air wars, the 100 square miles of sky over tiny Malta was clouded with all types of fighting aircraft, ranging

[R.A.A.F. Official Photo

No. 77 Squadron Meteors were greatly admired at Laverton by A.T.C. cadets, during their Australian tour.

from modern Sabres and Banshees to "fan driven" Shackletons and Sea Furies. Sometimes the Italians sent such antiquated craft as Lightnings and Thunderbolts into the fray.

The task of defending the George Cross Island against "enemy" pilots, whose combat tactics varied as much as their national temperaments and types of aircraft, was ideal training for the Australians.

Each R.A.A.F. pilot flew on the average of five sorties a day during the big N.A.T.O. exercises. On each sortie of fifty minutes or an hour, he was likely to have five or six sessions of "camera" combat. One minute he would be dodging out of the way of a Sabre, then diving from 30,000 feet to tree-top height in a chase after a Banshee, turning sharply to break even with a French Mistral, zooming after a corkscrewing Lincoln, "shooting down" a Firefly.

While the fighters were screeching across the sky or beating up Takali airfield, the R.A.A.F. ground staff worked at war-time pressure to keep the Vampires in top battle trim. They became expert at refuelling and turning round the fighters.

The Wing's biggest exercise was in Germany in July, 1953, when the Australians operated with the Second Allied Tactical Air Force in N.A.T.O. Exercise "Coronet." During that manoeuvre, R.A.A.F. pilots and ground staff lived in a forest in the Ruhr valley and fully proved that in twelve months the Wing had become a highly mobile, self-supporting unit.

On that occasion the Australian pilots in their slow Vampire 7's acquitted themselves well against overwhelming odds, for they were in a force which was opposed to the American and Canadian air defences of Germany, probably the strongest element of Western defence.

As well as flying against these "enemy" forces, the R.A.A.F. pilots often went to French North Africa or to Italy to fly as part of French and Italian formations. On several occasions Frenchmen and Italians visited Malta to operate with the Australians.

The number of modern warships in Malta—the key base of the N.A.T.O. Mediterranean Command—provided unlimited opportunities for air-sea exercises. Few fighter units in the world had more Fleet co-operation work than No. 78 Wing in the last two years.

In addition to air-to-air combat and Fleet co-operation exercises, No. 78 Wing operated with British Army Tank Regiments in a series of desert manoeuvres in Libya. In these exercises the R.A.A.F. Vampires fully exploited the opportunity of developing their ground attack and Army support duties.

Intensive air armament training was carried out from Malta, in the Libyan desert and at the R.A.F. Middle East Armament Practice Camp in Cyprus.

The standard of proficiency in this important phase of fighter work was illustrated when two of the Wing's pilots, Squadron Leaders J. Adams, D.F.C., A.F.C., and W. Horsman, D.F.C., won the air armament championship in the Middle East in 1954.

No. 78 Wing's record in Malta under Group Captain Brian Eaton, D.S.O., D.F.C. (now Director of Operations at R.A.A.F. Headquarters), and Wing Commander G. Newstead was first class.

It was no mere platitude when the R.A.F.'s Chief of Air Staff, Marshal of the Royal Air Force Sir William Dickson, said: "I express my thanks for the outstanding contribution No. 78 Wing has made to the defence of Malta and the Middle East. The Wing has won a great reputation for its skill, keenness and willingness to co-operate. It has indeed upheld the highest traditions of the Royal Australian Air Force."

[*R.A.A.F. Official Photo*

R.A.A.F. Avon-Sabre

No. 77 Squadron returned from Korea in H.M.A.S. *Vengeance*. As soon as the forty Meteor 8's brought back from Korea had been assembled at Richmond, N.S.W., and flown to Williamtown, No. 77 went off on a tour of Australian capital cities to show the flag. Formation flights were made over each capital city. Five Dakotas carried nearly 100 ground staff in Operation "Welcome Home."

In Korea, No. 77's personnel won 357 awards—3 D.S.Os., 1 O.B.E., 3 M.B.Es., 44 D.F.Cs., 6 Bars to D.F.C., 1 A.F.C., 18 D.F.Ms., 155 Mention-in-Despatches, and 126 American awards. The D.S.Os. were awarded to three of the Unit's Commanding Officers, Wing Commander R. T. Susans, D.F.C., Wing Commander J. R. Kinnimont, D.F.C., and Squadron Leader J. W. Hubble, D.F.C.

During the fighting period of the Korean War, No. 77 flew 15,071 operational sorties and fired 700,000 rounds of 20 mm. and used 34,175 rockets and napalm bombs. The Squadron's Mustangs and Meteors destroyed 3,700 enemy buildings and 1,408 enemy vehicles, shot down six enemy fighters including three MiG 15's. Pilot casualties were 16 killed, 14 missing in action (now presumed dead), 7 P.O.Ws. repatriated, and 4 still listed as missing.

The Squadron brought its Meteors back from Korea (most of the Mustangs are now being flown by the Korean Air Force), and while one squadron of No. 78 Wing is re-equipped with Avon-Sabres, the other two squadrons will be flying Meteors pending re-equipment.

With the Avon-Sabres flowing into No. 78 Wing, the R.A.A.F. will for the first time be operating an aircraft as good as, or better than, its opposite number in the world's Air Forces. The Avon-Sabre is having few troubles. It well may be that for the first time Australia's aircraft industry has given R.A.A.F. the world's finest operational fighter.

ROYAL CANADIAN AIR FORCE

THE R.C.A.F.'s DEFENCE COMMAND

THE R.C.A.F. has many individual duties and responsibilities, but none is more important than that of Air Defence Command. This Command is responsible for the air defence of Canada, a highly complex task calling for the finest available aircraft, equipment and personnel.

A.D.C., as it is called within the Air Force, has been and is getting just that—the finest available—and while it has not yet reached its full planned strength it is a potent force capable of giving a good account of itself should the need arise.

Before and during the Second World War fighter squadrons formed a part of the home-based defence forces. Even during that war, however, the question of enemy bomber attack on Canadian targets formed a very secondary threat. Today a different situation prevails. The danger is a prime one, calling for diversion of large resources to provide forces to be ready to warn of the approach of enemy bombers, locate those bombers, and destroy them.

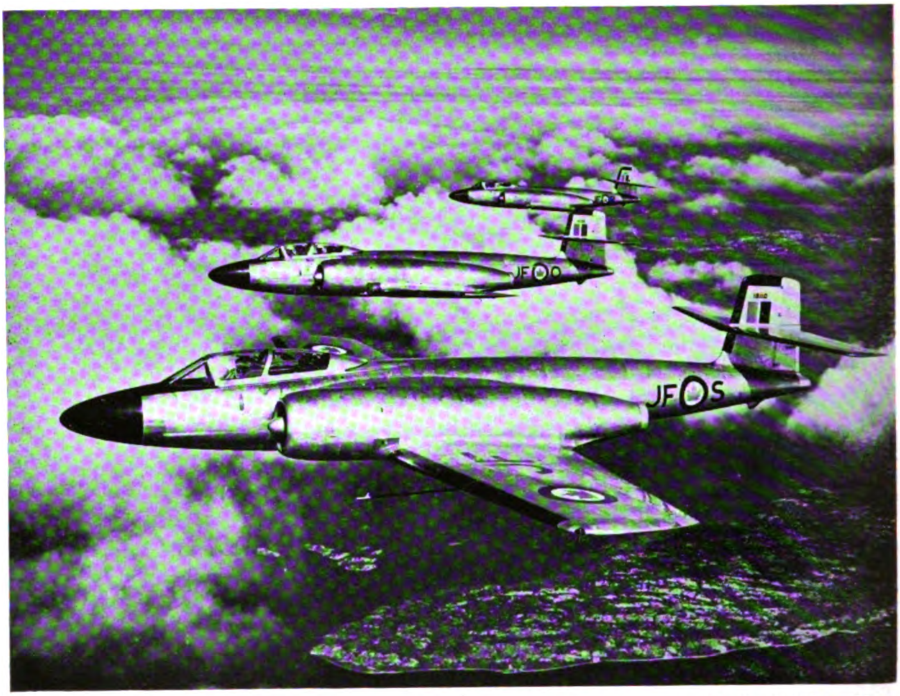
The R.C.A.F.'s post-war plans called for fighter forces to form the major operational element of the Service. In 1948 the headquarters that was to control these forces came into being. This was Air Defence Group, brought into being initially as a planning group at Air Force Headquarters and moved shortly afterwards to St. Hubert, outside Montreal, where it is still located.

Its aircraft, originally few in numbers, were at first Vampire jet fighters and Mustangs of Second World War vintage. Plans were under way, however, for provision of more deadly and efficient types—the F-86 Sabre and the C.F.-100 Canuck, and even as the first Vampire squadrons formed, time-tables were being drawn up for equipping of later squadrons with these two types.

The decision to expand the R.C.A.F. after Korea, and the decision to provide a twelve-squadron Air Division to the N.A.T.O. commander in Europe, affected Air Defence Command. It was decided that as fast as the single-engine Sabres came off the production line at Canadair Ltd., Montreal, they would replace the Vampires which were flown by the Regular Force squadrons, and would be used to form new squadrons.

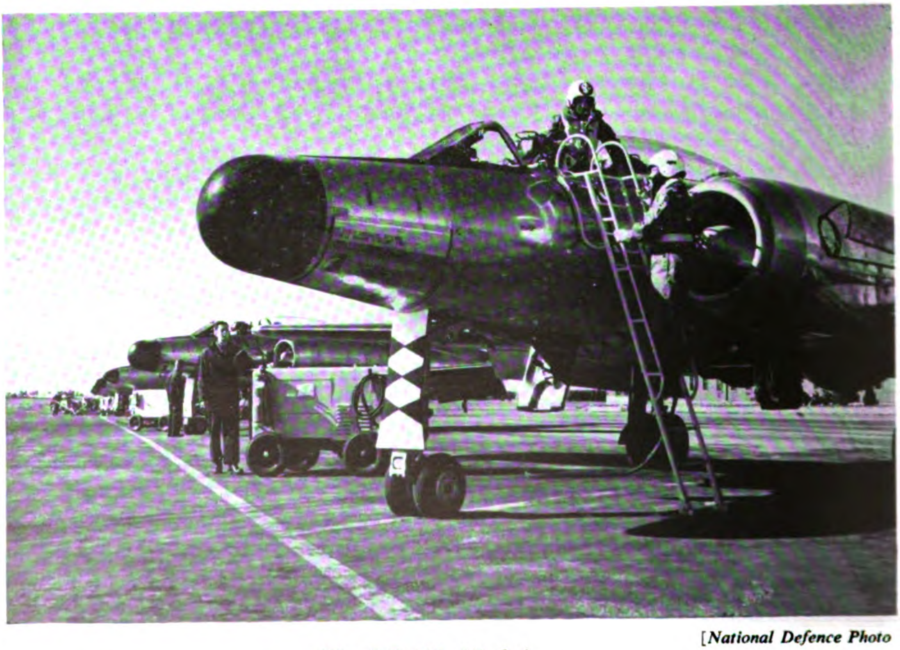
These squadrons were to be brought to a standard of operational efficiency by A.D.C., and then dispatched to the United Kingdom and Europe, to form the Air Division there. The programme called for a certain number of Sabre squadrons to be in Canada until the first Canuck squadrons had formed. These Canuck squadrons would form the back-bone of the home-based air defence forces.

This programme has been followed. The twelve squadrons making up the Air Division are all overseas and the logistic support unit to back them up is operating in the United Kingdom.



[National Defence Photo

The C.F.-100, Mark 3.



[National Defence Photo

The C.F.-100, Mark 4.

Squadrons of Canuck jet fighters have been formed and additional squadrons are being formed and brought to full operation efficiency. Latest of these was at Comox, on the West Coast.

The Canuck, which is playing such an important role in our air defence plans, was designed and produced in Canada by A. V. Roe Canada Ltd., to meet particular R.C.A.F. requirements for Canadian air defence. There was no other fighter available which could meet the needs of the R.C.A.F., and a decision to design and produce one in Canada was made. The Orenda engine, which serves as its power unit, was also designed and produced here. Now in operational service, the Canuck is proving itself a valuable addition to Canadian defence. The Mark 4 Canuck, an improved version over the type previously produced, is going into squadron service. The Canuck will include a new type of autopilot which is coupled to the fire control system. This permits more accurate attack procedures than are possible with a manually controlled aircraft. In addition, tests are being conducted and, if they are successful, this aircraft may be fitted with a new type, heavier calibre gun for use in conjunction with air-to-air rockets. However good it may be, no fighter aircraft remains a front-line plane indefinitely, and R.C.A.F. plans include the replacement, at a suitable time, of the C.F.-100 with a supersonic long-range all-weather fighter, an aircraft that does not exist today.

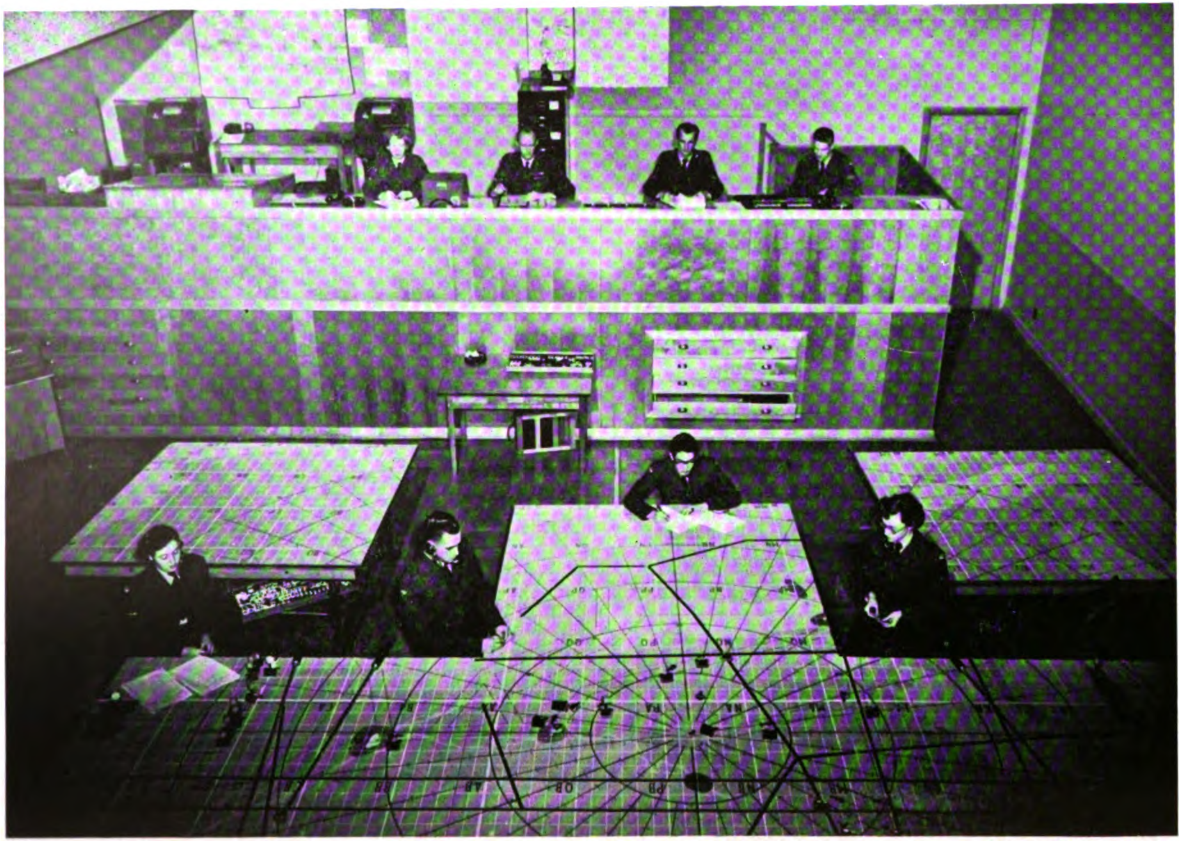
In addition to its actual fighter squadrons, A.D.C. controls two important advanced training establishments. These are the Operational Training Units at Chatham, N.B., and North Bay, Ont. The Chatham O.T.U. provides conversion to Sabre jets and tactical training for new pilots, having just won their wings, and for veteran pilots going on to jet operations. The other O.T.U., at North Bay, carries out a similar task, but in connection with the Canuck all-weather jet fighter.

The fighter squadrons themselves, with their screaming jets, armed with machine guns and rockets, form the most spectacular part of A.D.C. They form the final knock-out punch for invading enemy bomber fleets. But equally important is the radar early warning and ground control system, and the Ground Observer Corps.

Time was when the range of bombers was short, and their speed was low. Bombs could be dropped only visually, and the fighters took off as they approached, spotted them visually and went in for the attack.

Today that method cannot be counted on. Without an elaborate system to detect enemy bombers and direct our fighters to them, the interceptor squadrons would be of very limited value against invading bomber fleets.

An important part of A.D.C., therefore, is the network of radar stations which stand on guard to pick up, as blips on a screen, possible enemy bombers. These radar stations call for a tremendous amount of highly complex equipment, and for special skills by the personnel who man them. Their construction, usually in isolated areas, is slow and expensive. The initially planned network, however, will soon be complete, and the first step towards having additional early warning has been announced in the construction of a new chain across Canada, north of the existing one, to use equipment which has generally been known as the McGill fence equipment. The purpose of this is to give additional early warning. We have also had under consideration by scientists and military experts in the U.S. and Canada additional means of having early warning, and no doubt additional steps will be taken from time to time.



[National Defence Photo

R.C.A.F. STATION, FOYMOUNT
Surveillance Room.

In addition to devices to warn of the approach of hostile aircraft, there must be a system to direct the interceptors on to their targets. Otherwise, a mere change of course by the invaders would result in the defenders attacking an empty area of sky. A communication system to permit the squadrons to receive continuous direction from the ground is therefore a necessary part of the early warning network.

Early warning radar, however, has one weakness, a common one applying to our equipment and that of all other nations. It has limitations in regard to low-flying aircraft. This is remedied by the Ground Observer Corps, an essential part of Air Defence Command. Scores of thousands of civilian volunteer spotters operate throughout Canada. Their task is to report aircraft movements. Reports are passed in to filter centres, and on to operational centres. Reports of aircraft that cannot be identified as friendly are immediately investigated by the interceptor squadrons, just as are "unknown" blips appearing on the radar screens.

Closely connected with A.D.C. is the Army's anti-aircraft forces. Operational control by the head of the R.C.A.F.'s A.D.C. of anti-aircraft weapons is exercised through the commander of the Army's Anti-Aircraft Command, whose headquarters are alongside those of the A.D.C. commander.

The building of an air defence system is a long and complicated process, R.C.A.F. officials point out. It involves the replacement of outmoded equipment (a continuous programme, for no aircraft or item of major operational equipment remains "front line" for more than a limited period of time), and the integration progressively of modern complex equipment both on the ground and in the air. The fighter squadrons and the early warning system are the more noticeable elements in the overall air defence system. These, however, are backed up by a growing system of bases, landing strips, Operational Training Units, communications networks, armament ranges, and the whole complex organization that makes up a major operational command.

The R.C.A.F.'s A.D.C. works closely with the Air Defence Command of the U.S.A.F., which has its headquarters at Colorado Springs, Colorado. The officers, airmen and airwomen making up the R.C.A.F.'s A.D.C. don't speak of "the air defence of Canada." They speak of "the air defence of North America" when it comes to the question of possible invasion of the homeland by enemy bomber forces. Those making up the U.S.A.F.'s A.D.C. think in similar terms.

Reason for this is the assumption that Canada will not be fighting a major war on her own, and that to any contemplated enemy bomber force the 49th Parallel would mean nothing at all. Operational planning for air defence against such a bomber force, therefore, is done on a joint basis, and there is constant and close co-operation between the two Air Defence Commands.

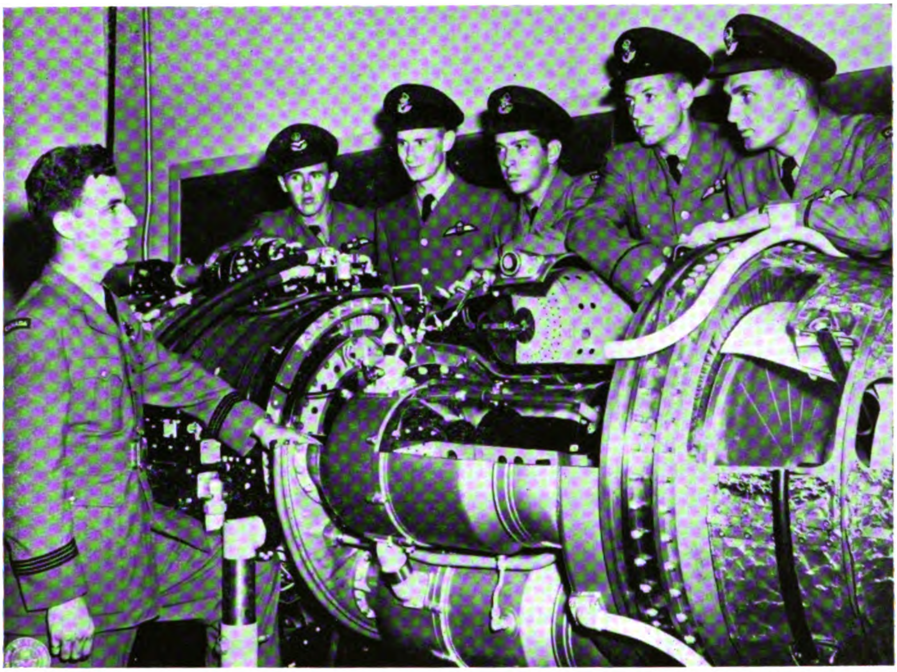
A war might conceivably find R.C.A.F. interceptor squadrons scrambling to battle an enemy bomber fleet winging towards a United States industrial target, while U.S.A.F. squadrons were tangling with another enemy bomber fleet having a Canadian target as its aiming point.

Some radar stations in Canada are manned by U.S.A.F. personnel, by agreement with the Canadian Government. In countless other ways the two A.D.Cs. work closely together. Sufficient progress had been made by 1952, in the building up of the R.C.A.F.'s A.D.C. to hold the first major air defence exercise in conjunction with U.S.A.F. forces. Known as Exercise " Signpost." it was aimed at jointly exercising the compone of the two defence systems and

[National Defence Photo

AIR FORCE IN NORTH—C.F.-100—FORT CHURCHILL

Airman and AVRO representatives making inspection of C.F.-100 in 20 below weather.



[*National Defence Photo*

Instructions being given pilots on the Mk. 2 Orenda engine used in the C.F.-100, at the Mobile Training Unit, R.C.A.F. Station, North Bay, Ontario. Left to right: F./Lt. John Thomson, Instructor, Toronto, Ont.; F./Offr. Meredith Green, Grand Manan Island, N.B.; P./Offr. Edward Francis, Lethbridge, Alta.; P./Offr. Jim Pocklington, Vancouver, B.C.; P./Offr. Malcolm MacKinnon, Olds, Alta.; P./Offr. Ed Charles, Vancouver, B.C.

testing the effectiveness of the co-ordination. In addition, evaluation of new equipment and the efficiency of manpower utilization was tested. Included were not only the Regular air forces and anti-aircraft artillery of both nations, but also the R.C.A.F.'s reserve fighter squadrons and radar units, and Canadian Army reserve A.A. units. A second such exercise, dubbed "Tailwind," was held during 1953, and a third one, called "Check Point," in 1954.

The reserve forces, which play a major part in overall R.C.A.F. plans, have a vital part in the plans of A.D.C. There are twelve reserve flying squadrons located across Canada, and ten of these are fighter squadrons. These reserve fighter squadrons, with reserve radar and other units, come under control of A.D.C. It is upon the twenty-four-hour a day watch and readiness maintained by A.D.C. and its many components that Canada depends for detection and destruction of an enemy bomber force. For continuous operations, however, A.D.C. depends heavily upon its reserve units, which would be called into action on short notice. Plans call for the reserve fighter squadrons ultimately to be equipped with the C.F.-100.

Those making up Air Defence Command know the importance of their task. They realize that aircraft and equipment, even though the best in the world, mean nothing unless matched with courage, skill and determination. They realize that their job is to maintain a watch, by day and night, to detect a possible invader and, by constant training and practice, to be ready to seek him out and destroy him. It is a job calling for teamwork and for high individual qualities, and those making up the R.C.A.F.'s A.D.C. are showing that they have everything the job demands.

THE AIR FORCES IN PARLIAMENT

(This article was completed on 28th February, 1955)

STATEMENT ON DEFENCE, 1955

HER Majesty's Government are to be congratulated on their "Statement on Defence, 1955" (Cmd. 9391, H.M.S.O., 1s.). It is a realistic document and has been well received by Press and public. It really faces up to the challenge of the hydrogen bomb and other thermo-nuclear weapons, thus: "Overshadowing all else in the year 1954 has been the emergence of the thermo-nuclear bomb. This has had, and will continue to have, far-reaching effects on the defence policy of the United Kingdom."

As both the U.S.A. and the U.S.S.R. are arming themselves with thermo-nuclear weapons, and as the United Kingdom can also produce them, the Government, "after fully considering all the implications of this step, have thought it their duty to proceed with their development and production."

Such is the power of these new weapons that accuracy of aim becomes less important than it was; and this greatly increases the difficulty of the defence, because "attacks can be delivered by aircraft flying at great speed and at great heights." The resulting loss of life and destruction would be unprecedented; and it is essential that the whole population realize this, and that they understand something of the effects of thermo-nuclear explosions and of the measures that can be taken to mitigate or to counteract them.

But just because the disaster of a thermo-nuclear war would be so great, there appears one ray of hope. The free peoples of the West, who have at present "a marked superiority in the weapon and the means of delivering it," have also no intention of using it aggressively. In their hands it becomes a very powerful deterrent; and it may well prevent the outbreak of a third world war, because any aggressor would be sure of suffering immediate and annihilating reprisals. It is the Government's "considered view" that "this deterrent has significantly reduced the risk of war on a major scale." "In these circumstances," continues the Statement, "our immediate duty and our policy are clear. To build up our own forces, in conjunction with those of our allies, into the most powerful deterrent we can achieve. By this means to work for peace through strength. Thus we shall hope to obtain real disarmament and relaxation of tension. But we must also so equip and train our forces and so organize the country as to enable us to survive and defeat the enemy if all our efforts for peace shall fail."

It has for some time been recognized that defence, in the present international circumstances, takes on three aspects, all of which are equally important. We have (*a*) to carry out our commitments in the Cold War, including any small local wars that may from time to time break out; (*b*) to build up a strong deterrent force to prevent a major war; and (*c*) to be prepared to survive and win a third world war, if it comes.

To combat local Communist aggression, infiltration and subversion in any part of the world, the Government intend to "strengthen by all means at our disposal, including where necessary the maintenance of adequate conventional forces, our defence against this method of attack." The strategic reserve of land forces, now being assembled in the United Kingdom, can, with the help of the Navy and air transport, "greatly increase our ability to exercise our world-wide responsibilities effectively and economically."

The deterrent will consist primarily, but not exclusively, of the strategic air power of the West, armed with nuclear weapons; and "this counter-offensive strength" will also be "our most effective defence against aggression should it ever occur." "A prompt and overwhelming counter-offensive with the most powerful weapons available" is contemplated; and this recalls Lord Montgomery's R.U.S.I. lecture of last autumn,* in which he said: "If we are attacked, we must set in motion an *immediate* air offensive on the largest possible scale, directed at the enemy's air forces and at his homeland" (p. 512); and "If we can maintain the ability to start a tremendous nuclear bombardment of the East *the moment we are attacked*, they cannot afford to do nothing about it" (p. 511).

"But," as the Statement says, "we cannot rely only on strategic air power." We shall still need a Navy which, with the assistance of our air striking forces, can "seek out and destroy the enemy's naval forces, preserve effective command of sea communications and support our land and air forces overseas. Nor will strategic air power be sufficient by itself to combat the potential enemy's enormous land forces. It must be assisted by conventional land forces, including the West German contribution, and using thermo-nuclear weapons, to "adopt a forward strategy on the ground in Europe"—not only to "defend the Continent, instead of contemplating again the grim prospect of liberation," but also to keep the enemy so far to the East in Europe that he will not be able to launch long-range ground-to-ground rockets or guided missiles against our bases in the United Kingdom and Western Europe. And, as Lord Montgomery also pointed out, the Home Base must be defended from airborne attacks and an efficient Civil Defence must be organized, which will include a Mobile Defence Corps consisting of parts of the Army and R.A.F. reserve forces.

The foregoing policy may now be translated into terms of the contributions which each of the three Services will be called upon to make. The White Paper's "broad review of the strategic implications of the thermo-nuclear weapon does not radically alter the role of any of the three fighting Services."

In the Cold War now being waged, the value of the Royal Air Force is being clearly demonstrated in Kenya and in the Far East. Great emphasis is placed on mobility and on the ability to reinforce overseas theatres with all types of aircraft at short notice; overseas commands are receiving new equipment; and Transport Command is being re-equipped to lift the strategic reserve and to co-operate with the Army in tactical airborne operations. The Navy's function in the Cold War is traditional—i.e., "to sustain our foreign and colonial policy." It must also be prepared to support our land and air forces overseas and, as in Korea, it can powerfully assist in land battles. But the Army must still bear the greatest burden of the Cold War, as it does of our military commitments in the Colonial Empire; and for this purpose it still needs conventional weapons. Its strategic reserve "can be used promptly to restore situations which might otherwise grow into serious or lasting commitments."

The Royal Air Force, with its "V" bombers carrying thermo-nuclear bombs, will provide the main contribution to the deterrent. The first squadron of "V" bombers are to be introduced this year. The Navy's contribution to the deterrent will consist of heavy carriers whose mobility, augmented later by guided missiles, will enable it to hit the enemy both independently and in support of allied land forces and land-based air forces. The deterrent role of the Army, using nuclear weapons tactically and supported by adequate air forces, will be to present an obstacle to the advance of the enemy's land forces.

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* Lord Montgomery's lecture, "A Look Through a Window at World War II," was delivered at the Royal United Service Institution on 21st October, 1954, and was fully reported in the *R.U.S.I. Journal*, November, 1954, on pp. 507 *et seq.*

"If it should come to global war, or hot war," says the White Paper, "the tempo will change dramatically. In the critical initial stage the primary role will fall to the Air Force. But the tasks of the Navy and of the Army will also be vital.... We rely upon the striking power of the Air Force for an immediate and decisive counter-blow; for a major contribution to the defence of this country against air and sea attacks; and for air support to the allied front in Europe." With these functions in view, the Control and Reporting System in the United Kingdom, already highly developed, is to be still further improved. Fighter Command has been expanded and is being re-equipped. "The balance of the Command is to be improved by a further increase in the proportion of all-weather fighters"; and air-to-air guided weapons are already on order. The efficiency of the 2nd Tactical Air Force is to be improved and maintained; and Coastal Command is to have some Seamew aircraft for short-range anti-submarine reconnaissance.

In order that the Navy may again fulfil its traditional role in a major war, its ships and naval aircraft must be equipped with the latest weapons and must be fully prepared to fight at the very outset of hostilities. Special attention is therefore being paid to immediate readiness, and a radical re-organization of the Reserve Fleet is in progress. To meet the threat of a hot war, the four divisions of our Army in Europe are being organized, trained and equipped with the most up-to-date weapons; and the rest of the Army is being trained to take part in hostilities elsewhere if necessary.

This summary would not be complete without reference to Research and Development. Manned bombers are being developed and produced as the chief present means of delivering nuclear weapons; but they may be supplemented by ballistic rockets, which are also being developed. Air defence of the U.K. in the near future will rely mainly on high-performance manned fighters using air-to-air guided missiles, and on ground-to-air guided weapons. The development of air-to-air guided missiles is well advanced; but that of surface-to-air guided weapons is less advanced because they are more complex and require longer time to be spent on research. And it was noted at the beginning of this article that the Government had decided to proceed with the development and production of the latest thermo-nuclear weapons.

Two criticisms have been levelled at the Government's Statement on Defence by Mr. Jules Menken in a letter to *The Times* of 21st February, 1955, supported by a leading article in the same paper. Mr. Menken says that the quantitative requirements for defence (considered in terms of money) have been seriously underestimated in view of the colossal spending of the U.S.S.R.; and he complains of the White Paper's disregard of time, lack of urgency and absence of drive which, he says, could prove to be a vital peril, since "no would-be aggressor is ever deterred by a non-existent threat, or by his intended victim's lack of defences." "We have," he adds, "about three years to get our own deterrent force and major defences in readiness." Shall we be ready in time?

THE SUPPLY OF MILITARY AIRCRAFT

Another White Paper, published the day before the Statement on Defence appeared, also calls for notice here. "The Supply of Military Aircraft" (Cmd. 9388, H.M.S.O., 6d.) contains a very reassuring statement which we can only hope is true: "This country has an effective air defence against what any potential enemy is at present able to bring against us. By night, the most likely time for attack, we have a better defence than anyone else in the world." This statement is perhaps the more remarkable because, as *The Times* pointed out, "the occasion of this White Paper is the unsatisfactory state of military aircraft supplies."

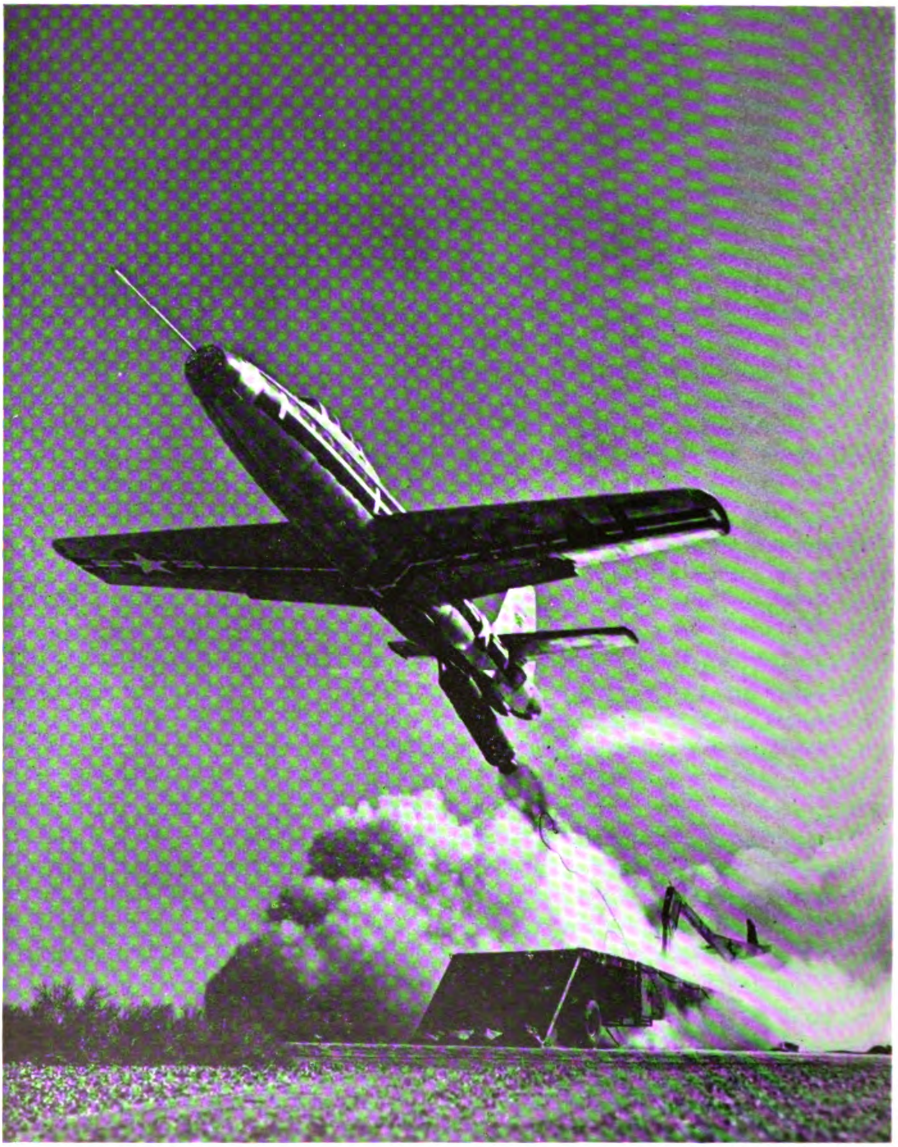
The Valiant is only just coming into service; the Vulcan and Victor are yet to come; the Javelin may be in squadron service a year from now; the Hunter has had difficulty with her guns stalling the engine, but it is believed that this has now been overcome; and the Fleet Air Arm's Wyvern still leaves much to be desired. Happily, however, there is something on the other side of the account. The Hunter, when it has got over its teething troubles, may prove to be the best fighter ever produced so far; similarly the "V" bombers, when they are all in service, may well be supreme; the Aden cannon is claimed to be far better than the armament of the MiG; and, in time, when the present programme of aircraft construction is completed, we may have "the balanced and powerful air fighting force appropriate to our resources and our standing as a great Power."

Granted that the supply of military aircraft is not at present satisfactory, what is the reason for it? It was decided after the war "not to take a major step forward in the re-equipment of the Royal Navy and the Royal Air Force with new front-line aircraft until about 1957." In 1946 it was also decided that, "in the light of the limited knowledge then available, the risks of attempting supersonic flight in manned aircraft were unacceptably great and that our research into the problems involved should be conducted in the first place by means of air-launched models." This decision was doubtless wise at the time, but it seriously delayed the progress of aeronautical research in the United Kingdom. Another reason for the delay was the economic situation a few years ago, when research and development had to be curtailed so that our exports might be increased and our trade balance restored; but this has now been largely overcome and we can afford to go ahead.

Some lessons have been learned by experience during the post-war years. Instead of only one or two prototypes, twelve or more are now ordered; so that testing and development of various features of the aircraft—e.g., performance, equipment, armament, etc.—may proceed simultaneously and progress may not be unduly delayed by one or two crashes. And the principle is now generally accepted that a new aircraft should be designed initially according to its purpose; and for a military aircraft this means that the weapons and equipment to be used in it must govern its design.

As to the question of keeping the Royal Air Force supplied with up-to-date aircraft, the White Paper states that, "owing to the rate of technical advances, it may well prove more economical in the long run to advance by shorter, though more frequent, steps." The result would be economy of resources and greater preparedness at any point. Development of new types would proceed continuously, but they would not all be put into production for service. If, however, war appeared imminent, the latest developments could be put into production at once. Thus the Service would never be far behind and could be brought up to date at short notice.

R. F. P.



[Photo: Martin Aircraft

THE MARTIN AIRCRAFT (U.S.A.)—MOBILE ZERO-LENGTH LAUNCHER

Roaring upward, this Air Force jet fighter is the first aircraft to carry a pilot aloft from the new zero-length launching platform. This highly mobile launching platform may some day make lengthy airstrips unnecessary.

CURRENT EVENTS

The Mobile Zero-Length Launcher

PILOTED jet-fighter planes are being launched like guided missiles. Using platforms mounted on trucks to explore the possibility of eliminating runways under certain combat conditions, the world's first flights of conventional jet fighters without preliminary take-off runs usher in a new era in aerial warfare. Employing the same principle and equipment used in launching the Martin Matador, an Air Force guided missile, engineers conducted experiments at Edwards Air Force Base, Calif. War-weary F-84-G Thunderjets made the historic flights.

Standard production Republic Thunderjets were modified so booster bottles could be attached beneath their tails, of the same type and size used on Matadors. Highly mobile trucks with "arms" raised the fighter planes to the launching angle and became the world's smallest airports. With the plane's turbojet engines running at full speed, the thrust of the booster bottles kicked the fighters off so swiftly they were immediately airborne. Martin test pilot said the shock of the unconventional take-off was less than that pilots experience during catapult take-offs. The planes were always under the pilot's control and a peak acceleration of four G's was reached. The launchers are sufficiently mobile to be moved quickly from one place to another.

The developers of the launching system envisioned jets operating close to front lines and presenting minimum targets to enemy bombers. Conventional landings could be made at forward bases and the aircraft immediately dispersed for maximum protection while readying for the next flight.

This is a new concept of fighter plane dispersal. It is especially important in the age of atomic weapons when a single enemy bomb might wipe out a conventional airport and make its entire area indefinitely untenable. Zero-length launching has been proved by nearly 200 Matador launchings during the past several years. The Thunderjets, considerably larger and heavier than the guided missile, have demonstrated that the technique is applicable and practical for fighters.

R.A.F. Air-Strips Bring Peace to Jungle Folk

Dusky little aborigines, among the jungle-covered mountains of Malaya, are playing their part in a R.A.F. operation which is making flying history. They are turning against the Communist terrorists who coerced them into providing food, shelter and an intelligence service, and are doing paid volunteer jobs around the 150- to 200-yard air-strips and police garrison stations which are being established all over the territories where they live. Aviation experts are incredulous about these air-strips until they see for themselves. Some have no approach at all except by air. Operation depends on the ultra-short take-off and landing performance of Prestwick Pioneer aircraft.

One strip in a valley bottom beneath 6,000 feet peaks was brought up to its 200 yards—which at the other end fell into a deep mountain torrent—by digging five yards into a sheer cliff face. Though it sounds like a pilot's nightmare, the new R.A.F. flying technique makes it quite safe. Pioneer pilots themselves choose sites, being dropped by parachute or helicopter or walking in, to find a suitable place among 300-foot trees that blank the sky. They sometimes take three hours to walk 200 yards through thick undergrowth. This and giant trees must be removed before aircraft drop in bulk supplies of food, petrol and

[Photo by "Scot News"

AIR-STRIP OPERATIONS—MALAYA

***A tough assignment clearly.** Air Vice-Marshal L. F. Sinclair, G.C., C.B., C.B.E., D.S.O., Assistant Chief of Air Staff (operations) followed by Wing-Commander Williams and Flight-Lieutenant M. E. J. Hickmott the pilot (Flight-Commander 267 Squadron) on arrival at Fort Blank in Prestwick Pioneer aircraft.*

Photo by "Scot News"

Volunteer aborigines give a hand.

ammunition. Operation "Friendship" has won all the aborigines for thirty miles round strips as helpers and allies, who can rely on R.A.F. supplies when food is scarce, They are helping to force the terrorists to surrender or flee. It is much more effective than bombing. And an aviation authority declares: "The R.A.F. has created something quite new in air-strip operation and proved there is virtually no territory on which an air-strip and the civilizing influence of air transport cannot be provided."

Stall Speed of Fighters Reduced 20 per cent.

A British jet fighter, a Gloster Meteor fitted with Rolls-Royce Nene engines, has been successfully flown using a new aeronautical technique—jet deflection. The new system is designed to reduce the take-off and landing speeds of aircraft, by deflecting the jet exhausts downwards so that they provide a component of vertical lift as well as forward thrust. They are located midway along the jet pipes, so that the thrust passes through the plane's centre of gravity. Test flights have been in progress since May last year, and the results may help greatly to make flying safer. When 60 per cent. of the thrust available from the Meteor's twin engines is used, the stalling speed is reduced as much as 20 per cent. by the new technique. The use of more thrust means a still greater reduction in stalling speed.

Giant Transport Aircraft

The first Blackburn Beverley of a fleet ordered for Transport Command of the Royal Air Force has made its maiden flight. The Beverley of 162-foot wing span, is one of Britain's largest landplanes, a monster aircraft with a payload of over 20 tons, designed for dropping parachutists and their support weapons, including guns and trucks, as well as for normal transport duties. It can cruise at 225 m.p.h.

In spite of its 60 tons of loaded weight, it does not require the long concrete runways which have become a feature of modern aerodromes. It can take off from a grass field only a thousand yards in length.

New Transonic Jet Fighter for Navy

The new plane is the D.H. 110, which is the fastest and most powerful fighter ever to go into production for use from British aircraft carriers. The D.H. 110 will also be the first aircraft to introduce transonic flight to British naval aviation. To give full control at diving speeds above the speed of sound, it has been fitted with power-operated control and an all-moving tail. These are also fully effective at the slow speed necessary for landing on an aircraft carrier. The 110 has already made a number of touch-downs on a carrier's deck, in the autumn of 1954, and arrested carrier landings will follow later this year. Designed to fight at well over 50,000 feet, it will carry guided missiles as well as its normal armament of 30-millimetre cannon. Power is derived from two Rolls-Royce Avon engines of the latest mark, which are situated close together so that if the plane is damaged in battle adequate control remains with only one engine operating. For night fighting and operations in thick cloud, the 110 will be fitted with a comprehensive range of the latest radar equipment. Its range will be much greater than that of the Sea Venom, the present all-weather fighter of the Navy.

* * * *

R.A.F. Teams for Gliding Championships

Making its strongest bid for national gliding honours since 1951, the Royal Air Force Gliding and Soaring Association will enter at least three teams in the National Gliding Championships at Lasham, Hants, this summer. They are from R.A.F. Little Rissington (Glos), Boscombe Down (Wilts), and Scampton, (Lincs). In addition, a team from the 2nd Tactical Air Force, Germany, may be entered, and individual R.A.F. entries are likely. The Association has already formed three "schools" to train specifically for the Championships, with Squadron Leader H. Neubroch in charge.

Air Commodore G. J. C. Paul, D.F.C., Chairman of the R.A.F. Gliding and Soaring Association, and Commandant of the R.A.F. Central Flying School, a leading R.A.F. gliding exponent for many years, will captain the Little Rissington team. The Scampton team will be captained by Sergeant W. D. Campion, who has been gliding since 1946 and has logged nearly 300 hours of unpowered flight, and Corporal A. Gough, another leading N.C.O. sailplane pilot, with nearly 1,000 hours, will head the Boscombe Down team.

Deciding the Best Bomber Squadrons

Visual and "blind" bombing contests for Canberra jets and Lincoln piston-engined aircraft of R.A.F. Bomber Command, to determine the best bombing squadrons and individual crews, will take place on the nights of March 28 to April 7 inclusive. Bombing will be carried out at heights ranging from 14,000 feet to well above 30,000 feet. Five trophies will be awarded on the results of the competition. The Laurence Minôt trophy will go to the Lincoln squadron achieving the most accurate blind bombing, and the Sir Geoffrey Salmond trophy to the individual Lincoln crew with the best blind bombing score. The Armament Officers' trophy will go to the Canberra squadron gaining the best score in both visual and blind bombing, and the Lord Camrose trophy to the best Canberra visual bombing squadron. The fifth trophy will go to the individual Canberra crew achieving the best blind bombing figures. Canberra squadrons will each enter six crews and Lincoln squadrons four crews for the contests. During each round, one crew from each squadron will bomb three targets in the course of a cross-country flight. Details of targets, routes and timing will be given to the squadrons four days before the start of the competition. The competition is also open to Canberra bomber squadrons based with the 2nd Tactical Air Force in Germany.

GREAT BRITAIN'S MAJOR WAR FORCES

By Squadron Leader John Miller, D.F.C., A.F.C.

INTRODUCTION

THE needs of Great Britain's expanding domestic economy and of its progressive social development are so great that manpower and resources for the armed forces must necessarily be very limited for many years to come. Nevertheless, Great Britain must continue to protect itself and its overseas interests, and must fulfil its international and Commonwealth defence obligations. Clearly, therefore, the armed forces that it maintains must be as economical as possible in initial cost and subsequent maintenance, yet capable of effectively carrying out the tasks that confront them.

THE TASKS OF THE ARMED FORCES

The tasks that confront Great Britain's armed forces are:

(1) Participation in the North Atlantic Military Alliance against the threat of the militant Communism of Soviet Russia.

(2) Protection of Great Britain's commercial, colonial and strategic interests overseas.

(3) Support of countries that are the victims of unwarranted aggression.

The first of these tasks is by far the most important; it is, in fact, participation in the preventing and perhaps the fighting of a major world war. The armed forces that Great Britain needs for this task will obviously have the first call on its available resources. Here, therefore, only these armed forces will be considered, for it is believed that if they are correctly determined, Great Britain will be able to afford the forces that it needs for the other two tasks without fear of economic bankruptcy.

Before the forces for this primary task can be determined, the nature of a future major world war with Russia must be examined.

THE FUTURE MAJOR WORLD WAR

The dominating factor in a future major war will be the power of atomic weapons. The enormity of this power has still not been grasped by the majority of people.

A single thermo-nuclear weapon exploded by the United States in the Pacific in 1952 had twice the force of all the bombs dropped on Germany during the Second World War. This weapon could create a void ten miles in diameter in the centre of Greater London; it could remove from the face of the earth cities the size of Birmingham, Manchester, Portsmouth and Liverpool; its radiation effects could kill people over an area of hundreds of square miles. Yet this weapon was comparatively small: in 1954 a weapon of four times the power was exploded.

Russia, too, has detonated thermo-nuclear weapons. Their power must be similarly enormous.

It must be assumed that the United States, Russia and Great Britain are all making nuclear and thermo-nuclear weapons. It must also be assumed that these weapons would be used in a future war. Indeed, against the enormous land forces of Russia, only the employment of nuclear weapons could prevent defeat and subjugation. General Gruenther and Lord Montgomery have both publicly stated this view; they have also stated that S.H.A.P.E. planning is based upon it. Russia, too, must be basing its military planning on atomic warfare, for by no other means could she defeat the strongest member of the Western Alliance, the United States.

Russia will not be suicidal enough to begin a major war before she can make effective attacks with atomic weapons against North America. The earliest possible date for the outbreak of a major war is therefore still some few years ahead. By that date the Russians and the N.A.T.O. powers will be capable of attacking each other with large numbers of intercontinental bombers and perhaps with some forms of the ballistic rocket.

Thus, major war would mean atomic bombing on a heavy and global scale and could only result in mutual destruction of a tremendous and almost unimaginable magnitude. Many ports, cities and production centres would be obliterated overnight; millions of people would be killed; and should the war last a long time—and a long time may well be only two or three weeks or even days—organized government would cease, and civilized communal existence would be blasted away.

This war of annihilation could benefit neither side, and so long as both sides are capable of waging it, it is extremely unlikely to occur.

However, even should it occur, it must be remembered that very few wars have continued until one side has been forced into unconditional surrender, or until both sides have beaten each other into extinction. The Russians may, therefore, begin a war believing that an armistice would be sought by the West as soon as it realized or believed that its atomic striking power was the inferior. The wisdom of seeking an early armistice in these circumstances would undoubtedly prevail over the hope that to continue might avoid defeat, for an armistice promises survival, whereas continuance promises only extinction.

THE MAIN FORCES NEEDED

It is evident that atomic striking power superior to that of the Russians is by far the most important military requirement of the Western Nations for two reasons:

(1) Atomic bombing on a tremendously destructive scale is the retaliatory threat that should prevent Russia from starting a major war. It is only by preventing the war that many of the Western Nations, including Great Britain, can hope to survive.

(2) Should a war begin, an atomic bombing capability greater than that of the Russians would be the only means by which the West could force an armistice on favourable terms.

The United States Strategic Air Command already constitutes an atomic striking force for the West, although it is not directly under N.A.T.O. command. Great Britain must, nevertheless, complete, maintain, and perfect the strategical bomber force that it is building for these three principal reasons:

(1) It is the only military force that will give Great Britain the strength to exert an international political influence at an acceptable cost in manpower and material resources.

(2) It is the only force which Great Britain will be able to operate against Russian atomic striking forces.

(3) It is the only force that would remain to deter Russia and prevent

Western Europe from being brought under Communist influence should the United States withdraw from European military and political affairs—an unlikely but not impossible event, particularly when the long-range B-52 force (which can operate against Russia without European bases) is in service.

Defence against air attack on the United Kingdom must be established as the next priority, for if Russia could, or believed that she could, eliminate by air attack a major part of the West's atomic bomber forces, the deterrent value of those forces would be greatly reduced.

LAND FORCES

Much has been written and said to indicate that N.A.T.O. military leaders contemplate a large-scale ground war with the use of atomic weapons in support of land forces as the primary means of defending Europe. "The plan for the defence of Europe is based on the maintenance of highly trained land forces which could be brought into action immediately after the outbreak of war. This shield, supported by air forces, should give the N.A.T.O. countries time to mobilize their reserves."

This defence conception—irrespective of its obvious lack of value as a deterrent—fails to face the full military implications of atomic war. For example, this "shield" would be the only land forces that would have the opportunity of resisting the Russian armies. There would be neither the time nor the freedom of movement for the mobilization, training, and dispatching of reserves. Indeed, the task of giving even the most slender logistical support to the regular forces making up the "shield" would prove almost insuperable. Clearly, resources spent on the maintaining of reserves for participation in land warfare in Europe are resources wasted.

Permanent ground forces of N.A.T.O. must, of course, be maintained in Europe, but not for reasons directly concerned with the fighting of a major war. The three main reasons are: firstly, to prevent incidents on the Iron Curtain frontier; secondly, to provide stability to Western Europe during and after the revival of Germany's armed forces; and thirdly, to give Western European countries the confidence and moral strength to resist Communist infiltration.

Thus, N.A.T.O. ground forces play their major role in peace time. Their size should therefore be determined by the needs of their peace time tasks. However, these involve no combat, and can be discharged almost irrespective of the type of weapons available. The shape of the ground forces should therefore be determined by the combat conditions of atomic war.

In that war all available air forces would be fully employed offensively or defensively in the battle for the establishment of atomic striking power superiority, and would not be available for the direct support of land or sea forces. Moreover, chaotic conditions as a result of atomic bombing would exist at ports and at communication centres. The land forces of N.A.T.O. must therefore be equipped, organized and trained to fight with the most scanty logistical and air support, and without higher direction.

Should war come, all that the N.A.T.O. ground forces could do would be to resist at isolated defence points. In contemplating this ground warfare in Europe, it must be realized that infiltration by the enormous Russian armies could not be prevented by the numerically inferior forces of the West. It must be accepted therefore that the longer the war, the greater the likelihood of European occupation by the Russians. However, provided Western atomic striking power were available in sufficient quantity, and the ground forces carried out their limited task, true military occupation could not be effectively established in the time available. There is no point, therefore, in contemplating large-scale and prolonged ground warfare either as a means of defending Europe or as a means of defeating Russia.

Great Britain's contribution to the N.A.T.O. ground forces should be as small as political equanimity will permit. Today, this is evidently about four divisions; but as the Western European countries become politically and economically more stable, and as Germany's rearmament gradually ceases to be an unsettling influence, it should be possible to reduce this number to a mere token force. Furthermore, the development of continental air forces should permit the reduction of Great Britain's continental based air forces to the needs of the advance elements of the United Kingdom's air defence system.

NAVAL FORCES

The combined naval forces of the N.A.T.O. countries are extremely strong. It is widely held that they would have two vital roles in a future war with Russia, and that therefore they constitute a deterrent.

The first role is offensive, and envisages aircraft operating from carriers in attacks against the land mass of Russia.

Carrier aircraft are inevitably inferior in performance (especially range) to contemporary land-based aircraft, and are likely to remain so for all time. They are therefore much less flexible. Moreover, the aircraft carriers from which they operate are even more vulnerable to air attack today than they were during the 1939-45 war. For example, a thermo-nuclear bomb dropped within five miles of a carrier would effectively put it out of action; whilst radar, guided bombs and high-flying jet aircraft will make the task of finding a carrier and attacking it comparatively simple. The task of finding and destroying over a global area a large number of airfields is clearly far more difficult. Moreover, to maintain carrier striking forces as a deterrent means maintaining them permanently in an area from which they can strike Russia, for a deterrent is not a deterrent unless it can immediately strike. Only countries with the resources of the United States can afford this tremendously expensive undertaking. Thus, the first supposed role of naval forces in preventing or fighting an atomic war is one that Great Britain should not sustain, for both military and economic reasons.

The second role is defensive and is the protection of sea communications should Russia undertake an attrition campaign against merchant shipping.

However, the essential ingredient of all attrition strategies is time: the duration of a thermo-nuclear war would undoubtedly be short—perhaps only a few days, but certainly not more than a few weeks. Indeed, it is difficult to imagine the United Kingdom surviving more than fifteen or twenty thermonuclear explosions. No matter how much merchant shipping is sunk, therefore, in the time available, it cannot affect the ability of the N.A.T.O. states to conduct the war or the ability of Great Britain to survive it.

Russian submarines, cruisers, minelaying forces, and maritime aircraft do not therefore constitute a threat to the security of the N.A.T.O. countries in a major atomic war. Thus, the supposed second role of the N.A.T.O. naval forces in fact does not exist.

Great Britain should not therefore devote resources and manpower to the maintenance and the building up of maritime forces (including land-based maritime aircraft) for preventing or fighting a major atomic war.

This conclusion does not mean that Great Britain no longer needs the Royal Navy. It does—but not for the major war threat.

THE MAJOR WAR FORCES SUMMARIZED

The armed forces that Great Britain should maintain for its primary defence task can now be summarized. They are:

(1) An atomic striking force of long-range bombers, giving way, eventually, to missiles.

(2) An effective air defence system of Great Britain.

In addition, although not for the fighting or preventing of a major war but, nevertheless, because of the threat of subversive Communist influence in Western Europe, Great Britain should maintain small numbers of lightly equipped ground forces in continental Western Europe.

CONCLUSION

It is realized that strategic atomic air power cannot be efficacious in preventing or fighting the small wars that Russia and China foster and encourage, or in protecting colonial and overseas interests. However, it is believed that Great Britain can only find the resources to meet these threats (and economic and not military resources may well prove to be those most needed) if it reshapes its armed forces and bases its defence strategy more firmly on atomic air power and nuclear weapons. The likelihood of war would then be extremely remote, and enormous economies could be made. The reshaping would necessarily be gradual; but economically, militarily, and politically, it is essential if Great Britain is to remain one of the leading nations of the world.

INVITATION TO CONTRIBUTORS

WISHING to maintain a fully illustrated Journal, covering a wide field of subjects of general interest to our subscribers, we invite our readers to contribute interesting photographs with a short story of the event they depict.

There must be many who have spent an unusual holiday, or been present at events of military aviation interest, during which photographs have been taken.

Such contributions would be considered for publication in AIR POWER if sent to:

The Editor of AIR POWER,
Chaseley, South Cliff, Eastbourne.

Those from Allied Air Forces would be particularly welcome, and payment in accordance with the interest value of the pictures and articles submitted would be made.

LEADERSHIP IN A 1955 AIR FORCE

CONDITIONS under which leadership is exercised in an air force today are vastly different to those in which army officers commanded soldiers in the past. We propose to consider whether it is necessary to change the guidance normally given to Air Force officers, regarding the qualities necessary and the methods of exercising leadership and command.

As a basis for the principles upon which such instruction has hitherto been given, we will take examples of guidance given nearly 100 years ago. The Earl of Essex addressed his officers as follows, before Worcester, in 1642:

> "I shall desire all and every officer to endeavour by love and affable carriage to command his soldiers, since what is done for fear, is done unwillingly, and what is unwillingly attempted can never prosper."

From an even earlier instruction to Captains it is set forth that:

> "He ought to be careful to keep his soldiers in action, whereby idle expense of time may be prevented."

Guidance for Lieutenants is included in the same manual:

> "He is to judge and determine disputes with gravity and good speeches .... He is to be careful that every soldier hath a sufficient lodging ... take due care of the sick and maimed, that they perish not for want of means and looking into; he is to take care that the Sutlers do not oppress and rack the poor soldiers."

In these examples we have some of the underlying principles upon which leadership has been founded for the past century, which have stood us in good stead in many wars.

The first exhorts officers to obtain the respect and confidence of their men by personal example and efficiency, rather than by an overbearing manner, so that they give the required services willingly and ungrudgingly.

The second requires the organizing of the duties of subordinates so that the men know they are usefully employed.

The third stresses the essential need for officers to take a personal interest in their men, seeing that they are properly housed and fed, that grievances are tactfully investigated, that justice is seen to be done and that any help that is possible to those in personal trouble is swiftly forthcoming.

In the army most officers had a specific number of men allotted to them, and there were few difficulties in carrying out these and other principles of leadership. Furthermore, in bygone years, soldiers were mainly uneducated and of lower intelligence and social status than their officers, being consequently greatly dependent upon them.

Today the circumstances are different in our Air Forces. A large number of junior officers have no aircraftmen allotted to their particular care; many are of the same social status in civilian life as their officers and are well educated and intelligent.

Do the changed conditions present grave difficulties in exercising powers of command and leadership? The underlying principles that govern an officer's relationship towards his subordinates have in no way changed. Whether on ground or flying duties, the officers and aircraftmen are an *indivisible team*, dependent upon one another's efficiency for the smooth operation of an Air

Force; officers still have authority and responsibilities. Even if not so employed now, every officer is a potential leader and must conduct himself accordingly.

It is obvious today that the execution of the principles of command and leadership must have a different approach to that of the past, but it is still essential, if it is to be successful, that the same officer-like qualities are retained. Among these qualities are (i) Efficiency and faultless personal example; (ii) unimpeachable justice; (iii) forceful character, aided by cheerful enthusiasm; (iv) understanding of fellow men; (v) tact; (vi) willingness to serve both superiors and subordinates.

In the press we sometimes read articles decrying the need in these democratic days for "officer-like qualities." We can ignore this, as the authors have no professional knowledge of the training for leadership in war or the reasons underlying the principles of that training. The aircraftmen's answer to such challenge would undoubtedly be "That we like to look up to our officers as our superiors and object to being led by our equals."

Many of the attributes desirable for modern leadership are given in the poem entitled " If," by the late Rudyard Kipling; add to these the qualities essential to an officer in Service life and you have the leader required by a 1955 Air Force.

In modern air warfare the team is frequently one of officers only and they will be supercritical of their leader. How essential it is, therefore, that his qualities of leadership are such that they inspire confidence in the team.

The main change in conditions between armies of the past and a modern air force which affect the modern teaching of leadership are the greatly improved status and intelligence of those to be led and the lack of close personal relationship between a great number of officers and aircraftmen, particularly junior officers, who have little if any practical experience in exercising powers of command or leadership.

On many stations full use is not made of opportunities that do exist to allocate at least a small section of airmen to the care of junior officers, employed otherwise only on flying duties. This is an essential part of their training for subsequent appointments and would, furthermore, build up a better understanding between officer and aircraftmen if they were given some responsibility of command.

Despite much that has been said and written to the contrary, there is no need for change in the essential qualities for leadership in a modern air force, to those expected in officers of a 100 years ago, but merely a need for change in the method of exercising with tact and sound common sense the authority *and responsibilities* placed upon them by virtue of holding Her Majesty's Commission.

Given the right material and adequate training during the *ab initio* period of their service in the duties of an officer, with progressive experience in the command of men, our Air Forces can produce leaders of the quality of one of its finest examples, Marshal of the Royal Air Force The Lord Tedder, to whose fine achievements all young Air Force officers should aspire.

Without discipline and order, freedom degenerates into license and chaos.—SOCRATES.

[Copyright by Baron

PRESIDENT OF THE ROYAL AIR FORCES ASSOCIATION
Marshal of the Royal Air Force H.R.H. The Duke of Edinburgh

THE ROYAL AIR FORCES ASSOCIATION

FORMED in 1930, as "The Comrades of the Royal Air Forces," it amalgamated with the "W.R.A.F. Old Comrades Association" in 1943 and changed its name to "The Royal Air Forces Association."

In 1952 Her Majesty The Queen, who is Patron, granted the Association a Royal Charter, and in 1954 it was honoured by His Royal Highness The Duke of Edinburgh becoming President.

The Association now has 770 Branches all over the world. They provide opportunities for comradeship, and for the realization of the Association's objects. These are, very briefly, to foster good fellowship, and, in co-operation with the R.A.F. Benevolent Fund, to do everything possible for the welfare of those who have served, or are serving, in Her Majesty's Royal Air Force.

The welfare problems are many and varied. First come those which involve direct payment of money in grants or loans. Such cases usually involve some element of distress, and the responsibility for dealing with them falls on the Royal Air Force Benevolent Fund. The Branches of the R.A.F. Association, appreciating this, do all they can to help and support the Benevolent Fund and since 1948 have subscribed some £102,000 to that Fund. In addition, the Branch Welfare Officers are always at hand to investigate cases and make recommendations to the Benevolent Fund.

Next are those cases connected with pension appeals, legal matters, employment, accommodation and similar problems. To deal with these the Association maintains a highly qualified staff, and in each Branch there is an Honorary Welfare Officer. The Association enjoys the valuable assistance of an honorary Medical Panel of eminent specialists, and an honorary panel of over 300 Barristers and Solicitors.

Then there is the need for visiting those in hospital or sick at home, and the provision of additional comforts.

Lastly, there is the question of financial assistance in cases not covered by the Benevolent Fund. An example of this was the pilgrimage organized and largely financed by the Association for relatives to attend the unveiling, by Her Majesty The Queen, of the R.A.F. Memorial at Malta to those with no known graves. Financial assistance for visits to sick relatives, war graves and so forth, also fall within this category.

While the first group is mainly the province of the Benevolent Fund, the last three are mainly the responsibility of the R.A.F. Association. The provision of these services does much to obviate the need for direct financial assistance. The work of the Association is therefore directly complementary to that of the Fund, and neither competes with it nor duplicates it.

On 3rd, 4th and 5th June, the Association is holding its Silver Jubilee Conference at Eastbourne, at which some two thousand delegates and visitors from all over the world will be attending. It will be the first occasion that the President, His Royal Highness The Duke of Edinburgh, has taken the chair at the Annual Conference. Many important matters concerning the welfare of ex-service men and women will be discussed.

Apart from many other events, a Commemoration Service, which His Royal Highness has expressed his intention of attending, will be conducted by the Chaplain-in-Chief of the Royal Air Force. At the service many hundreds of Branch Standards will be re-dedicated.

CRICKET IN THE ROYAL AIR FORCE

BY SQUADRON LEADER L. H. CLINT, R.A.F.

Hon. Secretary, Royal Air Force Cricket Association.

[*Air Ministry Photo*

VICE-PRESIDENT, R.A.F. CRICKET ASSOCIATION
Air Vice-Marshal The Earl of Bandon, C.B., D.S.O.

THE wet summer of 1954, coupled with steadily rising costs of travel and accommodation, have had their expected effect and, in common with many other clubs, the Royal Air Force Cricket Association finished the year financially poorer than they started. As a result, the Committee has decided that 1955 must be a year of consolidation and they have therefore instructed me to cut down the number of fixtures and to reduce the number of three-day games. This has now been done and this year we shall have a total of nine matches (against eleven) and three three-day games instead of five. One or two fixtures which involved us in long journeys and consequently heavy travelling costs have also been given up, and it is with particular regret that we have had to omit our extremely pleasant fixture with Devon on this account. We all hope, of course, that this is only a case of marking time and that soon we shall once more be able to forge ahead.

The new fixture list will again include our old friends, Worcestershire, Somerset and Derbyshire. New opponents will be Norfolk, whom we meet in a two-day match at Lakenham, while Bedfordshire reappear after an absence of several years.

A game which should prove of unusual interest will be that against a Commonwealth XI organized by Mr. George Duckworth, the old Lancashire and England wicket-keeper. Our opponents will include a number of famous players, many of whom will be over here on League Cricket engagements. The match, which will be played at Ebbw Vale, will open the National Coal Board's local holiday week. It should therefore attract a great deal of interest and will enable us to show the Royal Air Force Ensign in, for us, new territory.

The Free Foresters, who have been regular opponents for many years, will not now play against the Royal Air Force XI. Instead, this two-day fixture will be undertaken by the Adastrians—the Royal Air Force Officers' Cricket Club—and it is felt that the new arrangement will not only retain all the pleasures of this encounter but will also act as a most useful trial for officers in the running for places in the Representative XI.

The season will end with the Inter-Services Championship games, all of which take place at the beginning of August.

It is a little too early to discuss the shape of the team. On the debit side, it seems unlikely that Squadron Leader R. G. Wilson will be able to afford the time to play much serious cricket during the summer. Flight Lieutenant Maurice Fenner, our wicket-keeper, is now in Australia on a two-year exchange posting to the R.A.A.F., and Aircraftman Martin Horton has left the Service and should now be seen regularly in the Worcestershire XI. It is probable that the remainder of the players who appeared in the Representative XI last year will again be available if required, but even so it is quite evident that the batting must be strengthened if the team is to continue to win its matches. Last year, all the recognized bats got runs at one time or another but seldom all together in the same match. This got us through successfully until the final game, when, for once, they all failed with fatal results to our hopes of the Championship.

Squadron Leader A. C. Shirreff will again lead the side and, with Aircraftman R. A. Tindall, the young Surrey colt, and Aircraftman J. T. Murray (Middlesex), will probably have to shoulder the main batting responsibilities. Murray is likely to be Fenner's replacement as wicket-keeper. Aircraftman M. J. Cowan, fast left-hander from Yorkshire, and Pilot Officer T. A. Hall (Somerset), aided by Flying Officer Gordon McKinna, the Oxford blue who has been adding to his laurels with Pegasus during the winter, will lead the attack, but the remaining five places seem wide open.

There is more than a fair chance that we shall have the assistance of Colin Cowdrey. Cowdrey, who requires one more subject to complete his degree, may spend another term at Oxford, but it is more likely that he will come into the Royal Air Force and finish his degree whilst with us. There is no doubt that the presence of Cowdrey would act as a tremendous inspiration to the rest of the players and would probably succeed in welding them into a really formidable team.

Meanwhile the search for talent proceeds and already Command Cricket Representatives are busily engaged following up promising material in their Station and unit teams. I am glad to be able to report that Station and unit cricket is in a very flourishing state and that all the competitions last season were fought out, round by round, with tremendous enthusiasm and no little degree of cricket ability. We are often asked why the Association cannot do more in the way of coaching, but with nearly two hundred member units scattered all over Great Britain and Northern Ireland, the cost of effective coaching would be far and away beyond our modest resources. Much has to be left, therefore, to individual units. Some have already made local arrangements with indoor schools and quite a number are using facilities obtained from their County Clubs who, in nearly every case, have shown a most pleasing readiness to co-operate. We are, however, in process of trying out a new scheme which we hope will meet with popular approval. We have arranged cricket evenings at certain selected units to which neighbouring units will be able to send representatives. The plan provides for members of the Committee to attend and to be supported on the platform by one or two leading professionals. The programme will include talks on various cricket subjects, a film demonstration of batting strokes by Peter May, coaching hints and a general discussion.

Finally, I must mention a change in our Committee. Our President, Marshal of the Royal Air Force Sir William Dickson, cannot always devote to us the time he would wish and he has therefore appointed Air Vice-Marshal the Earl of Bandon as Vice-President of the Association to act as his deputy. The Air Vice-Marshal has already made his presence felt and we are all looking forward to a lively season.

FIXTURE LIST, 1955

Wed. May 4, 5, 6	Derbyshire	Ilkeston
Wed. May 11, 12, 13	Somerset	Taunton
Fri. June 3, 4	R.A.F. Trial	Hullavington
Wed. June 8, 9, 10	Worcestershire	Worcester
Mon. June 27, 28	Civil Service	Henlow
Wed. July 6, 7	Norfolk	Lakenham
Mon. July 11, 12	Commonwealth XI	Ebbw Vale
Thur. July 28, 29	Bedfordshire	Luton
Mon. Aug. 8, 9	Royal Navy	Lord's
Thur. Aug. 11, 12	The Army	Woolwich

* * *

THE ROYAL AIR FORCE SKI AND WINTER SPORTS ASSOCIATION

By Air Commodore J. Worrall, D.F.C.

IN the season 1953-4, 230 members took advantage of the low-cost holidays arranged by the Association at Ehrwald, Austria. In the season 1954-5 the numbers rose to 450, a popular innovation being air travel.

It is hoped to arrange ski holidays next season at much the same prices as for the season 1954-5, but at a resort which lies at a greater height and which has a greater variety of runs.

The holiday scheme is open to all members and ex-members of the three Services, their families and friends, who become subscribing members of their own service association. The annual subscription for this Association is five shillings each.

A popular feature of present-day holidays and air travel is that you may have your holiday and pay for it afterwards. The Association cannot make a similar offer, but it can accept your money in instalments in advance.

If you planned a ski-ing holiday in January, 1956, costing say £40, it could be paid for, starting in April, by ten monthly instalments of £4 each.

If, when the time comes, you find you cannot go, or you decide you would prefer to spend the money on something else, you may have your money back on demand.

Bankers' Order forms, which are being sent to those who are already members, are available on application to the Honorary Secretary, Flight Lieutenant P. D. O. Coryton, H.Q., No. 3 Group, R.A.F. Mildenhall, Nr. Bury St. Edmunds, Suffolk. An envelope stamped and addressed will be helpful.

ROYAL AIR FORCE ROWING, 1954-55

1954

IN a glass case in the Officers' Mess at Royal Air Force Station, Benson, Oxon, there reposes a dazzling collection of silverware, plaques and other trophies—the fruits of another year's triumphs by Royal Air Force Rowing Club oarsmen on the rivers and waterways of England, Europe and North America.

The R.A.F.R.C. Eight opened its 1954 season sensationally by winning both the Reading and Putney Head of the River races. In the latter it achieved fame as the only crew of 236 entered to cover the 4¼ miles in under 20 minutes (time 19 min. 58 sec.), and by being the first Service crew ever to go "Head" or even finish in the first twenty in the Putney event. This triumph stamped the crew as the finest Eight in Britain at the time.

It was then decided to disband the Eight and form a new one, and with some of the old Eight form a brand new Four to train for the Stewards Cup at Henley.

The new Stewards Cup Four soon showed itself to be a combination likely to make rowing history. Composed of Sorrell (bow), Porter (No. 2), Aircraftman W. H. Rand (No. 3), and, at stroke, Aircraftman M. Beresford, nephew of the famous Jack Beresford, it appeared in three regattas before Henley. Fast, beautifully co-ordinated, it won the Gold Vase for coxed fours at Nottingham Regatta, the Senior International coxless fours at Ghent, and the Stanmore Challenge Bowl (won by the R.A.F. in 1953) at Reading Regatta. By now, on form shown, many experts were predicting that the R.A.F. Four might soon become Europe's finest. At Henley it very nearly did!

There, after easy victories over London R.C. "A" and Kobenhaven Roklub, Denmark, it faced the mighty Russian Four, Krylia Sovetov, in the Stewards final. Drawing the more favourable station in the shocking weather prevailing, Krylia Sovetov were forced to the hilt by the fighting R.A.F. crew, which, rowing magnificently into the teeth of a fierce wind and driving rain, lost only by 1¼ lengths, and for much of the course held the Soviet level.

Other triumphs of the Four in 1954 included winning the Championship Fours in the Metropolitan Regatta, and placing second to Italy in the final of the European Championships coxless fours, in which seventeen nations competed.

Meanwhile, Senior Aircraftman S. C. Rand, who had rowed in the R.A.F.R.C.'s 1954 Head of the River crews, was menacing the supremacy of Britain's two leading single scullers, T. A. Fox and J. Marsden. He finished third behind Marsden and Fox in the first Scullers' Head of the River race ever held on the Tideway, in which four other R.A.F. oarsmen competed. At last Rand came into his own, outdistancing Fox by six lengths to win the Wingfield Sculls and so become amateur sculling champion of Great Britain—a great triumph for the young airman, for Fox had won the Wingfields for the three previous years, and in 1953 had won every major sculling event in Britain, including the Diamond Sculls at Henley.

1955

Scarcely known three years ago, the R.A.F.R.C. sprang into world prominence with its sensational achievements in the Thames and Wyfold Cup contests in the 1953 Henley Royal Regatta. With the advent of 1955, the Club can look back with satisfaction on 1954 as another year of notable successes, and faces its 1955 rowing programme with justifiable optimism. Although three of its finest oarsmen—Christopher Davidge, Colin Porter and Gavin Sorrell—are among those who have now left to return to civilian life (Sorrell to go to Oxford, Davidge and Porter to enter business), promising new rowing blood is expected at Benson in the New Year, to replace, and carry on for, those who, in little more than two years, have been largely responsible for making the name of the Royal Air Force respected wherever rowing is discussed. Newcomers are expected to include Pilot Officer John Dove, who was Captain of Boats at Queen's College, Oxford, and who is scheduled to become Captain of Boats, R.A.F.R.C.

CONTRIBUTORS PLEASE NOTE!

ARTICLES for our July number must be posted in time to reach the Editor:

(i) *From Serving Personnel* (to allow submission by the Editor to the Air Ministry for official permission to publish) by first post on Saturday, 14th May, 1955.

(ii) *Other contributors* by first post on Saturday, 21st May, 1955.

Articles should be addressed to:

The Editor of AIR POWER,
Chaseley, South Cliff, Eastbourne.

To assist in planning the lay-out of the Journal they should be as nearly as possible 1,100 words (two pages), 2,400 words (four pages), and must not exceed 4,000 words.

CONCERNING PERSONNEL

APPOINTMENTS

Among the promotions and appointments of Royal Air Force personnel announced by the Air Ministry since the publication of the January, 1955, number of AIR POWER are the following:

N.A.T.O. MILITARY AGENCY FOR STANDARDIZATION

The Standing Group of N.A.T.O. have approved the appointment of Air Vice-Marshal E. M. F. Grundy, O.B.E., as Chairman of the N.A.T.O. Military Agency for Standardization.

AIR MINISTRY

Air Vice-Marshal A. Earle, C.B.E., as Assistant Chief of the Air Staff (Policy).

Air Commodore K. J. McIntyre, C.B.E., as Director of Policy (Air Staff).

Air Commodore W. R. Worstall, O.B.E., A.F.R.Ae.S., as Director of Air Engineering.

Air Commodore I. D. McLachlan, C.B.E., D.F.C., as Director of Flying Training.

Air Commodore H. J. Kirkpatrick, C.B.E., D.F.C., as Director of Operational Requirements (A).

Air Commodore M. L. Heath, O.B.E., as Director of Plans.

Air Commodore W. E. Oulton, C.B.E., D.S.O., D.F.C., as Director of Operations (3).

Air Commodore E. M. Donaldson, C.B.E., D.S.O., A.F.C., as Director of Operational Training.

Mr. Handel Davies, M.Sc., F.R.Ae.S., as Scientific Adviser.

FIGHTER COMMAND

Air Commodore P. H. Dunn, C.B.E., D.F.C., A.D.C., as Air Commodore in Charge of Operations at Headquarters.

Air Commodore J. Grandy, D.S.O., as Commandant of the Central Fighter Establishment.

Air Commodore J. Worrall, D.F.C., as Commander of the Eastern Sector, Fighter Command.

Air Commodore D. G. Lewis, D.F.C., as Commander of the Southern Sector, Fighter Command.

COASTAL COMMAND

Air Vice-Marshal C. E. Chilton, C.B., C.B.E., as Senior Air Staff Officer, Coastal Command.

Air Vice-Marshal P. D. Cracroft, C.B., A.F.C., as Air Officer Commanding, No. 18 Group, and Senior Air Force Officer, Scotland.

MAINTENANCE COMMAND

Air Commodore L. P. Moore, C.B.E., as Air Officer Commanding, 43 (Maintenance) Group.

Air Commodore H. J. Butler, C.B.E., as Senior Air Staff Officer, No. 41 (Maintenance) Group.

GERMANY

Air Vice-Marshal D. G. Morris, C.B., C.B.E., D.S.O., D.F.C., as Senior Air Staff Officer, 2nd Tactical Air Force, Germany.

NEW SOUTH WALES

Air Commodore A. G. Adnams, R.A.F., to Command the R.A.A.F. School of Land/Air Warfare, at Williamstown, New South Wales.

PAKISTAN

Air Commodore W. D. J. Michie as Director of Maintenance and Supply with the Royal Pakistan Air Force at Karachi.

GROUP CAPTAINS' APPOINTMENTS

Group Captain A. L. Derry, C.B.E., to Headquarters, Home Command, for administrative staff duties.

Group Captain J. M. Freeman, C.B.E., to the Air Ministry for duty in the Department of the Chief of the Air Staff.

Group Captain R. T. Gethin, O.B.E., A.F.C., to R.A.F. Kinloss, to command.

Group Captain W. I. C. Inness, O.B.E., to R.A.F. St. Eval, to command.

Group Captain J. D. T. Revell, O.B.E., to the Joint Anti-Submarine School, to instruct.

Group Captain G. P. Woodhouse to Headquarters No. 42 Group for technical staff duties.

Group Captain A. C. Brown, O.B.E., D.S.O., D.F.C., to the R.A.F. Staff College, Bracknell, for directing staff duties.

Group Captain G. R. Magill, O.B.E., D.F.C., to Headquarters, Allied Forces, Central Europe, for staff duties.

Group Captain M. Wyatt, D.F.C., to Headquarters, No. 66 (Scottish) Group, for air staff duties.

Group Captain J. C. MacDonald, D.F.C., A.F.C., to R.A.F. Habbaniya, Iraq, to command.

Group Captain A. V. Rogers, A.F.C., to R.A.F. Manby, to command.

Group Captain H. T. Bennett to R.A.F. Syerston, to command.

Group Captain J. C. Larking, D.F.C., to Headquarters, Flying Training Command, for administrative staff duties.

Group Captain P. A. Lombard, D.F.C., to R.A.F. Pembroke Dock, to command.

Group Captain L. H. Anderson to Air Ministry Selection Board.

Group Captain N. H. Fresson, D.F.C., to R.A.F. Hendon, to command.

Group Captain D. P. D. G. Kelly, D.F.C., to the School of Land/Air Warfare, to instruct.

Group Captain P. A. Lombard, D.F.C., to R.A.F. Pembroke Dock, to command.

Group Captain F. E. Tyndall to the U.S.A.F. for liaison duties.

Group Captain W. P. Welch to Headquarters, R.A.F. Coastal Command, for air staff duties.

Group Captain C. M. Stewart, O.B.E., to the N.A.T.O. Standing Group, Washington, for staff duties.

Group Captain D. Lumgair to Air Ministry for duty in the Department of the Air Member for Personnel.

Group Captain J. A. Robinson, O.B.E., to Headquarters, Far East Air Force, for air staff duties.

Group Captain E. G. M. Charleson, O.B.E., to Air Ministry for duty in the Department of the Air Member for Supply and Organization.

Group Captain M. D. Crichton-Biggie, D.F.C., to Headquarters, No. 23 Group, for administrative staff duties.

Group Captain C. G. Stowell, O.B.E., to Headquarters, Flying Training Command, for administrative staff duties.

Group Captain E. A. Biddle to Headquarters, Technical Training Command, for administrative staff duties.

TO BILL

(AIR VICE-MARSHAL W. E. THEAK, C.B., C.B.E.
Died 29th January, 1955.)

Per ardua ad astra. And beyond:
Yet to no alien landing did you dare
This flight, but in a glad expectancy
To see the others waiting for you there
Who flew with us, and bore the destiny
Not once but twice to set the skies alight
With splendour. See, your brother with the rest,
They welcome you. And when we hear one night
A piano playing gaily in the Mess,
Or news of work done well and without fuss,
We'll drink to you. For that is how you played
Our pianos, and the game of life with us.

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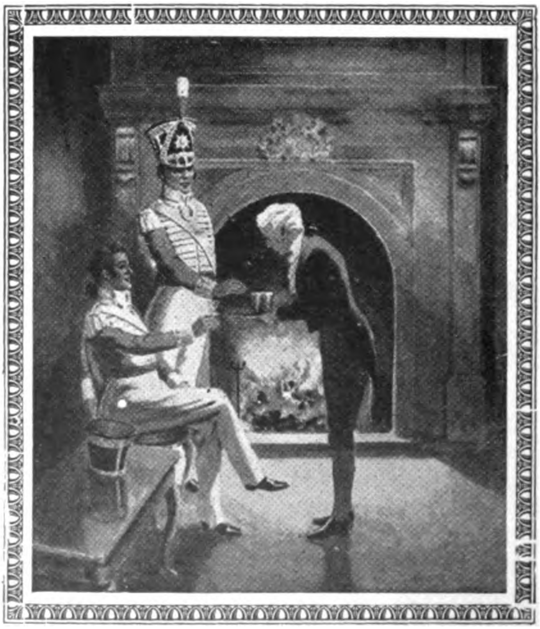

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BOOK REVIEWS

T. E. Lawrence—"The Mint." By 352087 Aircraftman Ross. (Jonathan Cape, London. 206 pp. 17s. 6d. net.)

Parts I and II are notes written by the late T. E. Lawrence whilst serving as a recruit in 1922 at the Royal Air Force Depot, Uxbridge. Part III, written three years later, is a description of his life as an aircraftman at Cranwell.

The original notes were made at a time when he was nervously exhausted, following the intense and almost continuous strain involved by war, by the struggle of post-war settlement, by the writing of the *Seven Pillars*, and by writing the whole again after the theft of the original manuscript.

I cannot but wonder, after reading this book, why these notes, by one who was so sick in mind at the time, were ever published. They can be so damaging to the Royal Air Force in which he had the honour to serve and to his own reputation.

In August, 1927, writing from Karachi, he tells Garnett (on whose orders the original typescript of the book was compiled) that he has cut up and arranged them in sections and is copying them *seriatim* into a note-book "as a Christmas gift to you." On 6th August, 1928, answering a letter from Forster, he wrote " . . . you wanted me to put down the way I left the Royal Air Force . . . . I had meant to go to a squadron, and write the real Air Force *and make it a book*—A BOOK, I mean."*

The most T. E. Lawrence himself intended (according to the preface) was to print a limited edition himself on a hand-press, and the final words to his notes are eloquent: "I can't write FINIS to this book, while I am still serving. *I hope sometimes that I will never write it.*"†

In view of the foregoing I wonder why it has now been published for circulation to the general public.

Those who knew "Lawrence of Arabia," at the time when he was doing a magnificent job of work for his country, leading Arab tribesmen in their spectacular raids on the regular Turkish forces, and those who only read of his exploits, set him on a pedestal as a national hero. It is with great sadness that one sees this idol brought toppling down and the disclosure of the "feet of clay" by this dull, dirty and pretentious book.

It is only natural that I seek to defend his reputation by stressing the sickness of his mind at the time the notes at Uxbridge were written.

His temperament was not that of an ordinary man. Dressed in Arab robes, living in close proximity with the late King Feisal and King Ibn Saud, leading their followers in sporadic raids on the Turks, he was in his element. Furthermore, he created in the minds of all Arabs with whom he was in contact a great impression of British prestige for valour and integrity. In such position as the leader of irregulars he was magnificent.

A "worm's-eye view," to those who have similarly undergone service in the ranks, can provide amusing reading; to others it can be enlightening. These notes now produced in book form are neither amusing nor enlightening. They might well be termed "a warped-eye view," written in a spirit of bitterness which magnifies and distorts service as a recruit at Uxbridge and produces an impression that bears little resemblance to the truth and maligns officers, N.C.Os. and aircraftmen of the Royal Air Force. This book reeks of self-pity and considerable egoism. To those who hitherto admired the author it is indeed disillusioning.

It is regrettable that, in his own disillusionment and bitterness, he should have vilified his Commanding Officer, who, now deceased, must rely on his brother officers to protect his memory. I knew this gallant officer personally over a long period. He was every inch a soldier, a brave leader of men and scrupulously just. Admitting that he was a very strict disciplinarian, he expected nothing of his men that he had not undergone, or would not willingly undergo, himself. He was one of those who helped to build up in the Royal Air Force a discipline which served it well in war. Admiring, as I still do, the very fine exploits of "Lawrence of Arabia," I can only think that, in his state of mental exhaustion and bitterness, he little realized how unfair and untrue was the record he left of one to whom the country owes a debt of gratitude and whose name, despite the unfortunate publication of this book, will ever be held in honour by the Royal Air Force.

---

* Preface by his brother, W. A. Lawrence.

† The italics are mine.

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Having struggled through the bawdiness, moans and complaints concerning life as a recruit at Uxbridge (through his warped vision), it is with some relief that one comes to a description of life as an aircraftman at Cranwell. It is a pleasant change from the witless dirty episodes and words with which the earlier chapters are spattered.

No longer lonely or under the strict discipline essential to convert a rabble into an efficient fighting force, or possibly more acclimatized to Service life: with the new joy of his powerful motor-bicycle which he found relief in racing at break-neck speed along the Lincolnshire roads, his outlook becomes less bitter. There are also less indirect comparisons to recall his earlier exalted position to that to which he had voluntarily humbled himself.

On closing the book I came to the conclusion that "Lawrence of Arabia," the companion of Kings and Sheiks, the glorified leader of Arab tribesmen, was a gifted leader in such conditions, ready to endure untold hardships and a very brave man.

As a recruit in the Royal Air Force, sick in mind and a bitterly disillusioned man, he was a dismal failure. His distortion and magnification of the trials through which normal recruits pass, in preparing them for life in any of the Fighting Forces, only throw a floodlight on his own abnormal outlook on life, his disloyalty to those in authority over him, and the fact that his egoism blinded him to the sterling qualities in others, from whom he could have learnt a great deal. As a recruit in the Royal Air Force at Uxbridge he was just a plain nuisance to those in authority and a very poor type of aircraftman.

A. H. S.

A Flier's World. By Wolfgang Langewiesche. (Hodder & Stoughton Ltd., Warwick Square, London, E.C.4. 255 pp. Illustrated. 12s. 6d.)

What is flying to you? A business, a sport, a highway to adventure, a means of dropping bigger and better bombs on people you are told to dislike, a thing of beauty, or a bore? Whatever your views, you should beg, borrow or buy this book.

It set out merely to "convey to those who do not fly something of the strange, topsy-turvy, illogical and wholly satisfying world of the pilot." Its object was to teach; and the result might easily have been just another textbook on aerodynamics and meteorology. But it's not.

It is so readable and so full of life that the reader hardly feels he is being taught. It comes almost as a surprise to realize suddenly that you understand for the first time the meaning of "Maximum Range Cruise," or the structure of a cumulo-nimbus cloud and why it is able to wrench an aeroplane to pieces.

Yet "readable" should not be construed as kindergarten three-letter-word stuff. There is as much real beauty and sensitive writing in *A Flier's World* as in anything by Saint Exupery. Mr. Langewiesche's trick is to mix in with the beauty a good measure of idiomatic American, to make his lessons stick.

Almost every paragraph contains some scrap of good advice, based on the author's lifetime of flying, testing and writing about aeroplanes. There is a whole section devoted to sorting out "What kind of animal is the small aeroplane? What it is good for? Why? and for whom?" Other lessons are short and to the point. On low-flying and "show-off" aerobatics he comments simply; "When the little boy in you says: 'Let's fly over and wave at Betty,' you tell him: 'Famous last words. Nix'." And he illustrates the correct approach to a flare-path with just six rows of dots that convey more than pages of photographs and notes.

Above all, this is a book that experienced pilots will enjoy as much as the beginner; because Mr. Langewiesche talks their language. Especially is this true of his description of a delivery flight he made from America, over the Atlantic, through Europe to the Middle East. Here is all the last-minute bustle, form-filling and delay known to every pilot; vividly descriptive impressions of places and faces, from Gander, the world's first air town, to a glimpse of six tiny camels treading a perfect course across a trackless waste of desert.

"You get in an aeroplane, because of distance, the same view you get in history because of time. Things get small enough to see at a glance: you see the whole before you see the parts." Perhaps it is because he has so often seen the world in this way, unclouded by irrelevant detail, that Mr. Langewiesche is able to present his facts in the same way. Yet the detail *is* there in full measure, making this one of the real classics of aviation literature.

J. W. R. T.

● The rise and decline of the Luftwaffe: the vivid personal account of Adolf Galland, the most famous of the German fighter pilots, General of the Fighters, and now tipped as head of the West German Air Force. He gives the first authentic inside record of the German use of air power, strategical and tactical, and of blunders and successes which still possess remarkable significance today.

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Australia in the War of 1939-45. By John Herington. (Angus and Robertson, London: 731 pp.: 95 illustrations: 35 maps. 25s. net.)

The author enlisted in the R.A.A.F. in 1940, served as pilot and captain of aircraft in 1942-3, with No. 202 (Catalina flying-boat) Squadron, R.A.F., at Gibraltar, then as an instructor at a Catalina training unit. In 1944 he undertook Intelligence duties, moving in 1945 to the Historical Section of Overseas Headquarters, where he had ample opportunity for studying the part played by Australians in the work of Coastal Command.

This book describes the part played by increasing numbers of Australians in the first four years of the air war in Europe and the Middle East, and the author, in his preface, acknowledges the generous assistance from official sources in avoiding errors of fact and interpretation; these include thanks to Mr. J. C. Nerney and Captain D. V. Peyton-Ward, R.N., of the Air Ministry's Air Historical Branch.

As the Australian contribution to air fighting consisted in the allocation of a large number of *individuals* for virtual incorporation within the Royal Air Force, as well as the gradual building up of an increasing number of Australian squadrons, this spreading of a comparatively small force among so many major and minor combatant units, must have presented the author with a difficult problem, when the narration of *Australia in the War of 1939-45* came to be compiled.

In 1939 there was one Australian Squadron in England and there were some 400 Australians in the Royal Air Force. At the end of 1943 there were about 15,000 Australian airmen serving in the war against Germany and Italy, a proportion of them in eighteen Australian Squadrons.

Yet to fulfil his purpose, the author has outlined the story of the air war as a whole, assessing its achievements and examining the commanders' policies in the light of German and Italian as well as British documents. In doing so he has maintained the interest in "Australia's part" by giving accounts of the experiences of individual Australian crews.

Individuals and units alike were so closely integrated with the Royal Air Force and so widely spread to all parts of the world where air operations were in progress that the author rightly claims that they took part in practically all noteworthy events. He makes no attempt to tell the complete history of the air warfare of 1939-45, but only why, when, where and in what degree Australian airman were involved; and in the absorption of the interest of their part, to avoid any misconception of the contribution they made to the air war, he gives frequent tables of bombing operations, to enable the actual proportion of the effort made by the Australians to the total to be assessed.

This volume is not only a contribution to the history of British Commonwealth relations; it is an interesting account of the air war from the Australian point of view.

A. H. S.

A Dictionary for the Forces. By Pierre F. Cardi, M.I.L. (Frederick Books, London: 264 pp. 10s. 6d. net.)

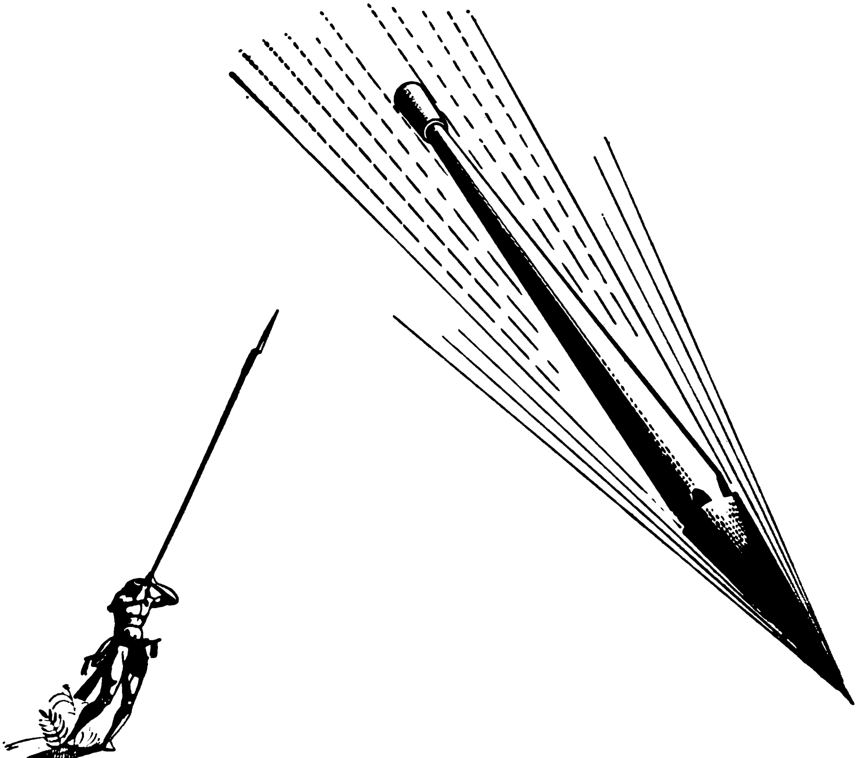
The author was a former Tutor of French at No. 30 Army Education Centre, and has compiled an English-French: French-English Dictionary for the Fighting Forces. The mechanics of war has changed in many directions in the past decades. We are facing a new era—the Atomic Age—with which many foreign language dictionaries have not kept pace.

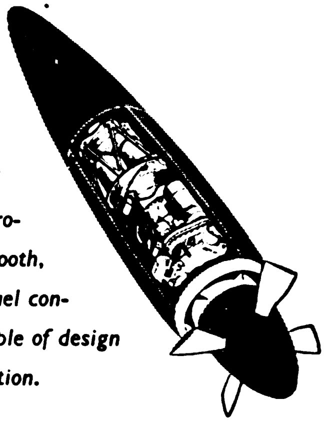
It is to meet this deficiency that the author has published this new work. It is not intended to contain all words in use, but specializes in those in general use in the Services, which of necessity must now include a large number of technical terms. Following the alphabetical list of these words there is a list of "Titles" of Headquarters and Commanders within N.A.T.O. and all the Service ranks of the nations' forces in that organization.

Whether one wishes to know the French for "Flying Saucer," "Atom Bomb" or merely the hospital, he will find them all in this useful little Services Dictionary.

The preface is by General De Larminat, President of the Free French Association who not only draws attention to the usefulness of this publication to members of the armed forces, but also its potential help in creating a better understanding between the British and French Fighting Forces.

A. H. S.





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Cheshire V.C. By Russell Braddon. (Evans Brothers, Montague House, Russell Square, London, W.C.1. 217 pp. Illustrated. 12s. 6d.)

This book could not fail to be a best-seller. Even if it described only Group Captain Cheshire's wartime career, it would contain more stories of gallantry and excitement than a dozen novels. But Cheshire is no less well known for his remarkable post-war crusade to help those who are mortally sick in mind and body.

Inevitably, the ways of such a man are not easily understood by the world at large. It is to Mr. Braddon's credit that he has not tried to hide Cheshire's more unorthodox characteristics under a marzipan layer of hero-worship.

It becomes clear from the opening chapter that Leonard Cheshire cannot be assessed by normal standards. By the time he went to Oxford his "only obsession was to live excitingly" and his " greatest horror was work." He was erratic, to such a degree that he even planned to fly the Atlantic in one of Alan Cobham's old biplanes, accompanied by a boiler-man who knew nothing of navigation but was " a jolly good bloke."

From such unlikely material, and with only a few hours' flying as a member of the University Air Squadron to his credit, grew one of the greatest, bravest airmen of all time—a man who, when his squadron of bombers could not see their target, circled low over it and ordered them to aim their bombs at him. A man who was awarded the Victoria Cross not just for one act of courage, but for month after month of supreme gallantry and leadership, during which the law of averages showed that he should have died four times over.

Post-war, although seriously ill himself, this man of violent contrasts has devoted his life to providing cheer and comfort for cripples, the chronically sick, the neurotic, the aged and the dying. He has become a religious crusader and, because they cannot understand him, some people have said that he is "round the bend." After reading this book, the reader may well think, like Russell Braddon: " Sometimes I would like to be round there with him."

J. W. R. T.

Jane's all the World's Aircraft, 1954-55. Compiled and edited by Leonard Bridgman (Sampson Low, Marston and Co. Ltd., 25 Gilbert Street, London, W.1. 384 pp. and index. Fully illustrated. £4 4s.)

For 45 years *Jane's* has reigned supreme as *the* annual record of aviation development and progress. It started in the stick-and-string pioneer days, when the monoplane was slowly growing in popularity. Then, following a series of crashes involving monoplanes, the biplane returned to favour, and *Jane's*, edited by the one-and-only C. G. Grey, faithfully recorded the design refinements that led from the Sopwith Tabloid and Avro 504, through the Bristol Fighter, Moth, Hannibal and a hundred other great names, to the Rapide, Swordfish and Gladiator.

But by then the monoplane was again in fashion, and *Jane's* illustrated the first Hurricanes, Spitfires, Empire flying boats, and the Messerschmitts of the newly-born *Luftwaffe*. The wheel seemed to have turned a full circle . . . but not quite . . . for in this new edition of *Jane's*, published in a streamlined jet-age, is a picture of a machine as fantastic and ungainly as anything found in the very first issue of 1909—the Rolls-Royce " Flying Bedstead." It reminds us that we are only at the "Wright Brothers' stage" of a new aviation age that will dispense with vast areas of concrete runway and bring at last the answer to "C. G. Grey's" oft-repeated plea for "aircraft that land slowly and won't burn up."

Meanwhile, what is there in this year's *Jane's*?

By and large, the mixture is as before—comprehensive, accurate and well presented. The Aeroplane Section contains descriptions and specifications of aircraft produced in 30 countries and includes 625 illustrations, of which 326 are new. In the Aero-Engine Section, comprising 67 pages, there are 110 illustrations; and in the Airship Section just one. In addition, there are the usual reference sections on World Airlines, International Organizations and World's Records; and diagrams of the national markings of 62 air forces—a valuable feature found in no other standard reference work.

Inevitably, the Russian section is disappointing; because Mr. Bridgman includes only types *known* to exist. This makes *Jane's* a little less exciting, but a lot more reliable than many of its contemporaries. It is, in fact, as always, a *must* for all Station Libraries and for anyone else who can afford four guineas' worth of concentrated aviation facts and figures.

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The Last Battle—the Memoirs of a German Fighter Ace. By Peter Henn. (William Kimber & Co. Ltd., 46 Wilton Place, London, S.W.1. 214 pp. Illustrated. 15s.)

Peter Henn was one of the second generation of *Luftwaffe* pilots, who never tasted the fruits of easy victory. He was flung into the battle in 1943, at a moment when Hitler's reverses had begun to grow really serious. The Allies were landing in Sicily, after sweeping Rommel's armies from North Africa and, as Jules Roy writes in the Introduction to this book, "There is nothing like defeat to put a little depth and humanity into the service mind."

Even in 1943, Henn had few illusions about the outcome of the war, and he paints a grim picture of what it meant to be a *Luftwaffe* pilot in the years of mounting Allied air power. Harried by an ever-improving succession of American and British fighter 'planes, his squadron could obtain nothing better than the Me.109. In one of several wordy sequences, he describes how this little fighter, once the fastest in the world, was gradually loaded with so many new gadgets and modifications that it exceeded 300 m.p.h. only because it loved its pilot.

Henn's Me.109 must certainly have loved him because, in the opening chapter, he describes how it carried him to safety from an emergency air strip in Sicily after its rudder had been broken off and a smashed wheel had been replaced by a spare wheel from an army vehicle! All of which seems to make Mr. Henn a natural candidate for the Tall Story Club.

Nevertheless, there is quite a lot worth reading in *The Last Battle*. It is interesting, for example, to study the tactics forced on the *Luftwaffe* by the overwhelming Allied air forces. We see a momentary turning of the tide of battle when the German fighters switched to head-on attacks on the Fortress formations; and then the hopelessness of their task when strong fighter escorts began to accompany the "Forts."

Goering arrived to lecture them, "with an enormous revolver at his belt, a hotel porter's cap with gold braid on his head, Don Cossack riding-boots on his feet and a painted face." He called them cowards and, most surprising of all, told them that they must not in future jettison their external fuel tanks when in combat, because this wasted precious fuel. This order was immediately and surreptitiously countermanded by Galland, who realized that it would condemn the fighter pilots to death. But they were condemned to death anyway. In the end, Henn was one of the very few survivors, and even he had lost his legs in a crash.

This book, more than almost any other, emphasizes that the days of chivalry and "wizard shows" in air warfare are past. J. W. R. T.

The Jet Aircraft of the World. By William Green and Roy Cross. (MacDonald & Co. Ltd., London: size 9½" x 11½". 176 pp.; several hundred photographic illustrations; three separate indices—(i) Jet Aircraft of the World; (ii) Jet Engines; (iii) Jet Aircraft. 30s. net.)

This volume gives a striking picture of the progress, accelerated by war, of jet aircraft, its gradual eclipsing of the piston engine as a prime mover and the effect on aircraft design resulting in the variety of strange new shapes now to be seen in the world's skies.

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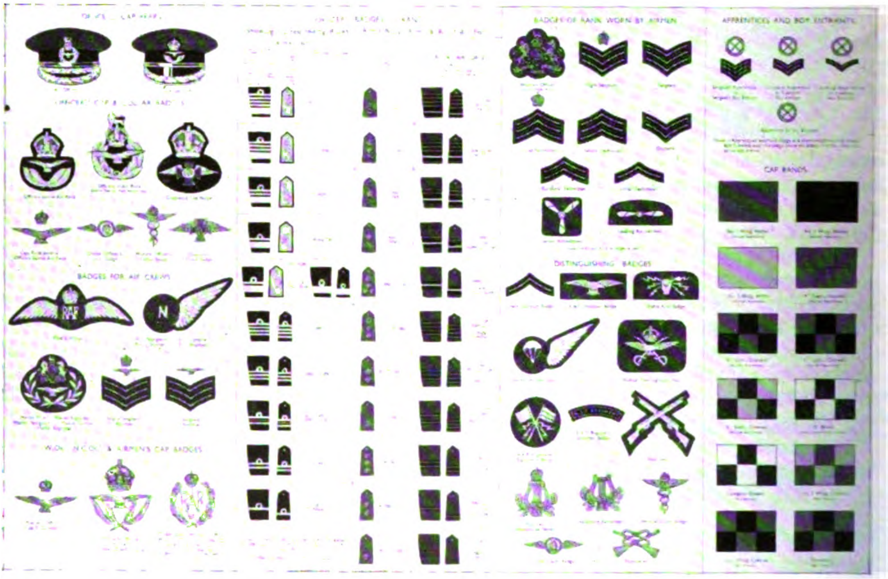

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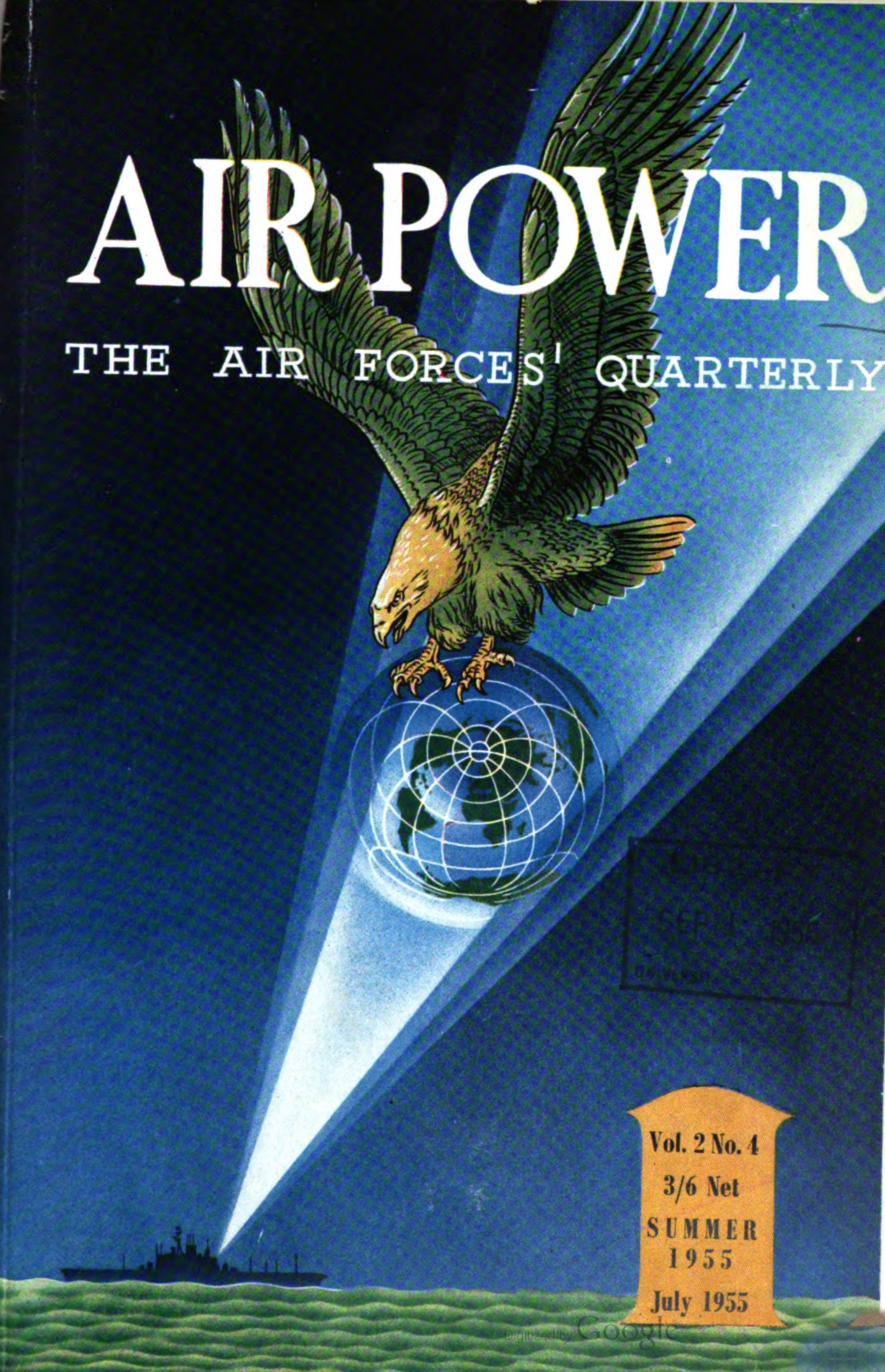

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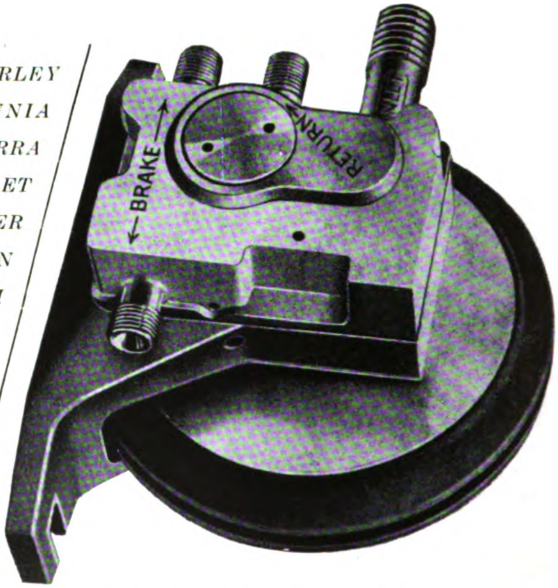

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EDITORIAL

PEACE TALKS: FUNDAMENTALS (21st May, 1955)

APPEARING on the horizon is the conference between the heads of the Great Powers.

Different from the past, this one should not merely provide a forum for Communist propaganda but, from our increased and growing military strength, should offer promise of compromise and achievement.

The object is clearly to reduce the tension between the Communist bloc and N.A.T.O., thereby removing the danger of a third world war.

OUR world is suffering from a sickness from which it will surely die unless action is taken first to check it and then cure it. As always, before any cure can be decided upon, the cause of the sickness must be diagnosed and action taken to remove the *fundamental cause*, before deciding what treatment is most likely to offer a permanent cure.

ALTHOUGH not the basic cause, it became apparent ten years ago that a grave situation was arising when, having eliminated the threat from Nazi aggression at an unprecedented cost of human lives, suffering and treasure, at a time when our hopes for an era of world peace were just dawning, an even greater danger to freedom-loving peoples arose swiftly.

Despite the speedy reduction of their enormous military forces to the needs for peace and occupation of Germany, by the rest of the victorious allies, Russia retained all her vast armies and air strength and proceeded to increase them far beyond her needs for peaceful purposes.

This was the *primary cause* of the present world tension, the first pull on the rope which made the Western Powers unite and rally to pull on the other end, before from their weakness they were pulled over. As their strength grew, so the tension increased. There is little doubt that, if the weaker team had not possessed a predominance of atomic bombs as an anchor to their end of the rope at the outset, by now they would all have been pulled over into the Soviet camp.

With the growing strength of Russia in air power and atomic weapons, unless some other means are found of settling this matter, the tension on the rope will increase until, sooner or later, the bombs at both ends will go off, disintegrating both teams.

WHAT is the position today, vis-à-vis military strengths and the cause of this race in armaments?

Firstly, it was the overwhelmingly superior military strength of Russia. Compared with that of the Western Powers it was as Goliath was to David, but in the latter's sling was the atomic bomb, the possible consequences of which held the Communist forces inactive. This was not the only cause of our anxiety. Taking advantage of the fear of war created in other nations, they proceeded to interfere in the affairs of these nations by fermenting and backing hot wars in Korea, Malaya, Indo-China and elsewhere, as well as engaging actively in cold wars and incitement to strike among our peoples, and so to hinder and undermine our efforts to build up and maintain strong defence forces capable of thwarting their military ambitions.

The building up of our defence is now actually used by Russia as an excuse to continue to increase her military strength still further. In particular she is increasing forces which would mainly be used for aggression; her air striking force and naval attack force.

No one would deny that we are "encircling" Russia. To restrain a dangerous animal, the first thing to do is to try and put it in a cage where it will be less dangerous.

When Western Germany is armed, this great increase in manpower will strengthen our surface forces against Soviet armies. In the near future it is now clear that the overall strength of the Western Powers will be such that Russia could not launch military aggression with any hope of success.

It is from this military position that we can base our hopes upon something useful now arising out of a conference between the heads of the Great Powers.

AT such a conference, a readjustment of all types of military strength, on an agreed scale of disarmament would remove the *primary cause* of present world tension and ease temporarily the fear of a nuclear war, the result of which would be too horrible to contemplate.

THIS would not remove the *fundamental cause* and unless this is removed there is little hope of a permanent cure of the world's sickness.

The basic cause of the race in armaments, that can only end in wars, small or large, unless something is done about it, is that in the ideology of the rulers of Communist peoples is the principle that Communism cannot succeed unless it is also accepted, by force or infiltration, by all peoples of the world.

It is for this purpose, and this purpose alone, that the U.S.S.R. continues to build up forces with which she hopes to force her ideology upon those who prefer their own free way of life, the freedom of the individual, rather than live under the dictatorship of the Kremlin.

THESE are the simple facts which have brought the world to its present crisis. From these a conference will have to find a path which will lead away from a third—and final—world war.

Upon what reasonable basis could such discussions hope to achieve the removal of world tension and realize our hopes of a lasting peace?

The Western Powers are hardly likely to agree as a *first step* to the abolition of the hydrogen or other atomic weapons, their only counterbalance to the superior air strength and manpower of the Communists, even under international inspection, without some considerable reduction in the air and surface forces of the Communists.

From our own renewed military strength it is unlikely that any dangerous appeasement of the U.S.S.R. will be forthcoming.

The first problem appears to be an agreement on general disarmament in national forces to the needs for peace—this in stages which at no time would leave either the Communists or Western Powers at a military disadvantage not present today. This accomplished, the *primary cause* of world tension would have been removed.

Clearly this is not sufficient for lasting peace. The *fundamental cause* must be completely eradicated. The principle referred to earlier in the Communists' ideology is a fanatical belief and, although the ability to interfere in other nations' affairs will have been lessened by removal of the fear of military aggression, this interference is likely to continue unless some guarantees of safeguards against this cause of world unrest can be found.

If Russia really has peaceful intentions, these difficult major problems can be solved in the interests of mankind, and there is little doubt that a solution of the numerous other differences, upon such matters as the unification of Germany, the unrest in the Far East and the free choice of a way of life by the satellites, can also be found.

The weight of the responsibility upon our national leaders is indeed a heavy one.

A PLAN FOR PEACE

THE *"Order of Priority"* of the stages of disarmament *is vital*. Not to take first things first would at some stage place the Western Powers at the mercy of aggression by the Communists. The years of toil and sacrifices made in building up their present defence would be thrown away for a dream of peace.

It is suggested that the principal stages should be as follows:

1955.—Proof of honesty of intentions.

1st *Before* any reduction in armaments begins there must be set up in each country, and *operative*, adequate international control teams with complete freedom of movement and access to any place,* with a guarantee of no hindrance to their supervision.

1956.—Removal of Primary Cause *of fear of war.*

2nd Reduction of the vastly superior military strength of the Communists compared with that of other nations:
STAGE 1.—Reduction of air strength ratio (*a*) bombers, (*b*) fighters.
STAGE 2.—Similar reduction in other arms.
STAGE 3.—Withdrawal of occupying forces of East and West in Germany.

1957.—Disarmament to peace basis and abolition of atomic weapons.

3rd Further reductions in air, sea and land forces of all nations to an agreed scale necessary for the maintenance of order within their own realms in peace.

4th As a safeguard and guarantee that 1, 2 and 3 will be effectively carried out, the possession of the hydrogen and atomic weapons would be retained by both East and West *to the last*. The Western peoples would never use them unless attacked. The Communist leaders know this, but their ideology is such that, without this safeguard to the last, it would be unwise to risk a change in heart of the Russian rulers. Stages 1, 2 and 3 completed, stocks and means of manufacturing such weapons could be destroyed and bases on foreign soil relinquished.

COMPROMISE in many details there undoubtedly will be, but it would be an unwise statesman who agreed to expose his people to the dangers that would follow any major changes in the order of priority of disarmament, without adequate guarantees. With effective disarmament achieved, the ideal behind the setting up of the United Nations control might well be achieved, even to removing the remaining cause of unrest in the world, i.e., the interference by foreign powers in the affairs of other nations.

World peace might then appear on the horizon.

A.H.S.

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*Realizing the vastness of Russian territory, any less effective supervision would be futile.

TARGETS OF PRIORITY

By J. M. Spaight, C.B., C.B.E., LL.D.

NUCLEAR WAR POTENTIAL AS TARGET

IN a nuclear-weapon war the enemy's nuclear war potential is likely to be the target of first priority for a strategic air force. Other targets will tend to fade away into the background. A shrewd American military critic made a forecast to that effect a few years ago. He was writing before the hydrogen bomb had appeared on the scene, but what he said is equally if not more applicable to the era of the later and more terrible weapon. " Situations may arise," he said, " when the atomic industry will be the only important target of an air force. . . . The battle for the atomic industry will be furious. . . . The mere existence of atomic bombs may ensure that this battle can be won conclusively—with the utter destruction of the bombed facilities. True to the dialectic character of all previous history, the atomic bomb bears in itself the power to limit its destructiveness."* Perhaps a process of Kilkenny-cattery of the weapons of mass destruction will bring to pass the elimination of them from national armaments which was agreed to by the United Nations in their resolution of January, 1946.

" Give me the order," said Major-General Orvil Anderson, Commandant of the Air War College, Montgomery, Alabama, in 1950, " and I can break up Russia's five atom-bomb nests in a week." That was rather a tall claim. The "nests" may be far distant, particularly well defended and hard to find. The points from which the aircraft delivering the bombs would take off would probably be more accessible and more open to attack. Those points would also be targets of first priority. Nuclear war potential embraces necessarily the capacity for launching the weapons. It includes, therefore, the bases of the bombers carrying the weapon and, as is stated later, the factories in which the aircraft and aero-engines needed for this purpose would be constructed. Radar and electronic plants in general would also be high on the list. Some reference to this question of priority of targets was made by Sir Winston Churchill in his speech in the House of Commons on 1st March, 1955.

THE LAUNCHING BASES

" There are," he said, " a large number of targets which we and the Americans must be able to strike at once. There are scores of airfields from which the Soviets could launch attacks with hydrogen bombs as soon as they have the bombers to carry them. It is essential to our deterrent policy, and to our survival, to have with our American allies the strength and numbers to be able to paralyse those potential Communist assaults in the first few hours of the war, should it come." It was important, he said later, that " targets which would threaten us should be given what we consider the necessary or deserved priority in the first few hours. Those targets might be of such cardinal importance that it would really be a matter of life and death to us."

A similar target priority has been advocated in the United States as the best way to defend that country. " The best and the only true defence of our bases and population centres and industrial areas is for our deep penetration attacks to destroy the intercontinental bombers of the Red Air Force on the ground. Such penetration attacks with atomic or hydrogen bombs against Russian air bases constitute the true strategic defence."†

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*Stephen T. Possony: *Strategic Air Power*, Washington, 1949, p. 132.

†Brigadier-General Bonner Fellers: *Wings for Peace*, 1953, p. 188.

AIRCRAFT AND OTHER PLANTS

There were also, Sir Winston Churchill said in the speech quoted above, big administrative and industrial targets behind the Iron Curtain, and these should be paralysed at the outset or shortly after. He added that submarine bases and other naval installations should receive " early attention." Among the industrial targets to which he referred there would be included, it is safe to assume, the large establishments in which the materials of atomic and hydrogen bombs are produced, those in which the bombs are made, and the factories in which the aircraft and engines needed to deliver the bombs are constructed. Aircraft factories, it is true, were not a very profitable target in the Second World War. A German authority who was in the best position to evaluate the results of the Anglo-American air offensive against them has stated roundly that they were a failure. General Adolf Galland has shown that in spite of repeated attacks they were never put out of action. In September, 1944, the German aircraft industry produced 4,103 aircraft of all types, the highest monthly figure for the whole war.* The situation will be different in a future war if the new super-weapons are used. It is difficult to see how the aircraft and aero-engine plants could escape destruction if a really big and sustained offensive were directed against them. But it may still be that, as in the last war, there will be still better marks for an enemy's bombs. In that war it was the attack on *oil* targets which, as the same authority shows, really immobilized the Luftwaffe. " The most successful operation of the whole Allied strategical air warfare," says General Galland, " was against German fuel supply. This was actually the fatal blow for the Luftwaffe. Looking back, it is difficult to understand why the Allies started that undertaking so late, after they had suffered such heavy losses in other operations. Right from the start, fuel had been the most awkward bottle-neck for the German conduct of the war."† The German armies felt the impact of the shortage, too. The depletion of oil reserves, says General Eisenhower, caused a "continuous crisis" in German transportation.‡ That chapter of history may repeat itself in a future war.

OIL AS A TARGET

A bomber offensive against oil targets would yield a multiple return. Oil is not only an element of nuclear war potential, being the motive power of the carrier of the weapon, but it is also an essential item of surface forces' needs for operational and logistic purposes. To reduce the available supply of it is to diminish *pro tanto* an enemy's capacity for moving and fighting in the air, on land and at sea. There is, in fact, no other target which can rival it as a mark for an opponent whose aim is to hamstring the other's war effort in general. The war potential as a whole of a belligerent whose oil plants and refineries are put out of action cannot but be gravely affected.

Oil would be a particularly promising objective in a war against Russia. Providence has seen fit to place her chief sources of mineral oil in the extreme south of the country. The Caucasus region is still the main centre for this supply, and it is a very vulnerable region. It is wide open to bombers coming up from the south and south-west of it, and the Allies have in the area a number of air bases from which attacks could be launched. The aircraft of that great carrier task force, the United States 6th Fleet, might also be able to take a

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*A. Galland: *The First and the Last*, English translation from the German, 1955, p. 312.

†*Ibid.*, p. 279.

‡*Crusade in Europe*, 1948, p. 402.

hand in the good work. So vital is the Caucasus as an objective that a French naval authority has said that " the defence of the west is now not on the Rhine but at Baku."§ It is worth noting, too, that the best German commander of the last war, Rommel, dreamed while that war was still raging of a day when the British and Americans would be fighting the Russians and launching air attacks from the south on " the oil areas on the Caspian Sea," which he called the " Achilles heel " of Russia.||

The Caucasus oil area could be turned into a desert. That would not have been practicable, probably, in the last war; it should be possible in the next if the new super-weapons are used. The whole region could be made desolate by massive and repeated attacks with nuclear bombs. There would be no hole or corner of it that would be free from the radioactive contamination that would be caused. How could Russia possibly maintain her war effort if this essential contributory to it had to be written off the account? It would mean, for the time at least, the virtual end of Russia as a great military power. Oil is in any case one of the weak spots in her armour. Her total production is only 7.7 per cent. of world production. That of the United States, which is not so large nor so populous a country, is 49.5.*

THE DECISIVE BLOWS

The great Anglo-American air attacks on oil and communications were, says the short British history of the air operations, " the really decisive blows " of the last war.† They may be, in combination, the decisive attacks of the third world war, if it should come. If it does come before 1960, as some prophets foretell, that is, before the Soviet Union has come a little nearer to parity—if it ever does—with the United States in nuclear weapons, it will come in the form, in all likelihood, primarily of a vast land assault which will be powerfully supported by the Red tactical air force. Any strategic operations against targets in the Western Allies' homelands will probably be subsidiary to this main attack. Even if a strong German contingent is then in the line, the Soviet armies will still be numerically superior to those of the West. They are fairly certain to look upon that superiority as their trump card. The Allies, it may be assumed, will try to make up for their inferiority by using the tactical nuclear weapons which are becoming increasingly available. That was the appreciation of the foreseen situation which General Gruenther expressed, explicitly or by implication, on more than one occasion in the last few years. The massed Soviet formations, concentrated for the assault, would be an ideal target for the new weapons.

COMMUNICATIONS AS TARGET

What of the Allies' strategic air forces? Of the two distinct purposes which they may be called upon to fulfil, namely, the spoiling of the enemy's capacity for mounting nuclear air attacks and the stopping of his land forces from overrunning the Western line of defence, the former will best be served, it would seem, by the selection of oil targets as long-range objectives, while communications will probably be regarded as the preferable target in the other case, though here also a diminution of the enemy's oil supplies will be of advantage to the defence. In no way could the Western Powers' strategic air forces con-

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§Contre-Amiral Lepotier: *La Méditerranée*, in *Revue de Défense Nationale*, July, 1954, p. 17.

||*The Rommel Papers*, edited by Liddell Hart, 1953, p. 499.

*Dr. G. M. Lees: *World Oil Reserves* in *United Empire*, Sept., 1954, p. 166.

†H. St. G. Saunders: *The Fight is Won*, 1954, p. 387.

tribute more effectively to the success of their armies' resistance than by interrupting the flow of reinforcements and supplies which the invaders will need. They should be able to cut off the Soviet divisions from their sources of revictualment and munitionment. The allied air forces, Mr. T. K. Finletter, the former American Air Secretary, has said, could so interfere with the enemy's logistics as to " make any enemy troops which had penetrated the N.A.T.O. defences die on the vine."‡ There might possibly be in store for the Russian troops an even greater catastrophe than that which befell their predecessors at Tannenberg in 1914.

We know what happened in France and Germany, too, in 1944-45. Allied air attacks threw the enemy's communications into utter confusion. They made the maintaining of the German formations in the west an almost heartbreaking task. The success of the Normandy invasion was due to a material extent to the tremendous plastering which the French railways suffered. General Eisenhower said in his despatch of 13th July, 1945: " By D-day the Strategic Air Forces, together with the Tactical Air Forces, had so successfully performed their mission of disrupting enemy communications that there was a chronic shortage of locomotives and cars, repair facilities were inadequate, coal reserves reduced to six days' supply, and seventy-four bridges and tunnels leading to the battle area were impassable. The communication chaos thus produced had a fatal effect upon the enemy's attempts at reinforcement of the threatened areas after our landing."

Later in the year the great assault was switched to the western marches of Germany. The effect was no less great. On 5th January, 1945, Martin Bormann wrote to his wife: " On the left bank of the Rhine the whole railway system is completely destroyed and at a standstill—and what that means to our lines of communication to the front you can well imagine."*

It was because the air operations had been so "outstandingly successful" against the French railways, says Air Marshal Kingston-McCloughry, that they were extended to Germany as a whole in the autumn of 1944. "The effect of this offensive against transportation," he says, "coupled with that against oil, was to deprive Germany of the effective use of her disposable forces against the advancing allied armies." It was, he says, "a principal factor in the final collapse."†

One stage, Operation "Clarion," at the end of February, 1945, was described vividly by General H. H. Arnold in his *Third Report* to the Secretary of War. "All over Germany," he wrote, "bombs exploded on signal-control points, marshalling yards, main lines, level crossings, embankments, bridges, viaducts, round-houses, over-passes, small junctions. . . . Operation 'Clarion' marked the end of large-scale mobility for the German army."

RUSSIA'S RAILWAYS

In a future war the Allies' air forces, using the new weapons, should be able to improve upon the record of massive sabotage of communications which was set up in 1944-45. Russia's lines of communications will be much longer and far more vulnerable than Germany's were then. Her railways are inadequate in peace; they would be strained to breaking-point in a war in which her armies were engaged in major operations far beyond her western borders. Difficulties and delays would be caused in any case by the fact that the Russian railroad track is a wide-gauge one, while the Western system is a narrow-gauge. The point of transference from the one to the other would be a promising objective for the allied bombers. The latter would also find a number of bridges crossing broad rivers as targets. It should be possible, indeed, to sever effectively the railway links between the Russian armies in the west and their sources of supply in the east. Neither road nor air transport could be relied upon to fill the gap which the cutting of the rail connection would leave. The air assault on the railways should be the more successful because, as Sir John Slessor has said, Russia "can be attacked from almost all round the compass."‡ Bombers coming in from every angle would be difficult to waylay.

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‡T. K. Finletter, *Power and Policy*, 1954, p. 53.
The Bormann Letters, 1954, p. 160.
†E. J. Kingston-McCloughry, *War in Three Dimensions*, 1949, pp. 81–2.

THE GOVERNING PRINCIPLE

It will be seen that this article deals at some length with two categories of possible targets for the Allies' strategic air forces in a future war. It may be thought to devote too much attention to them and to omit reference to other targets which it would be profitable to attack. There are such other targets, and they would assuredly not be neglected—e.g., the naval bases from which enemy surface and submarine fleets could prey on our sea-borne commerce; but to try to cover them all would be to extend unduly the length of the article. Their general nature can be made clear by a statement of the principle governing the selection of particular targets.

The principle is simply this: that the proper function of air power is to *disarm*. It can perform that function as can no other arm of war. It can do so not only by destroying the enemy's weapons made or in the making but by hampering the movement of them from the localities where they are held by or for the enemy to others where he can bring them into use with more effect against his opponent. It is definitely a defensive function. The alternative possibility, that we should rely on massive counter-action at places of our own choosing, carries the implication that the places in question are not or need not be those at which the enemy has chosen to hit at us. The counter-action contemplated is retaliatory rather than protective or defensive in the strict sense; and retaliation and defence are different things. They could be equated only if defence were interpreted in a way which those "defended" would, quite naturally, be reluctant to endorse. It *is* defence to strike the weapon from the would-be assassin's hand or to prevent it from coming into his hand.

SELECTIVE BOMBING THE SOUND POLICY

To skip that stage in war and to attempt to gain a decision by a knock-out blow, that is, by an attack on the enemy's will-to-war at the centre, at his Government's and people's morale in general, would be in comparison a gamble. It might or might not come off, and if it did not come off it would leave the enemy in possession to a greater extent of the specific means of hurting us than if we had concentrated our attack on those means from the first. There is nothing of a gamble in a strategy the aim of which is to render the enemy so far as is possible incapable of hurting us.

Before hostilities have begun the prospect of the appalling calamity which it would mean if a non-selective attack were made upon the belligerents' homelands serves, it is true, as a deterrent of war. Well and good, if that grim prospect does avail to avert war. If it does not, the position changes. The "great deterrent" has failed of its purpose. It is then surely the sounder course to try to make the war that has come as little calamitous to ourselves as possible and for that reason to go all out to paralyse those agencies of destruction which the enemy might use to our undoing. Concurrently we should aim at turning his preponderance in ground strength into a handicap instead of an advantage to him, and this we can do by cutting off his massed legions from their sources of supply.

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‡*Strategy for the West*, 1954, p. 31.

Here is a magnificent opportunity for strategic air power. Why should it go searching for other targets when these are to hand? There is an ethical argument, too, for the adoption of such a selective target programme, but it is subsidiary to the strategic one, as it was, indeed, in the last war. Sir Winston Churchill wrote in September, 1940: "It was not solely on moral grounds that we decided against retaliation upon Germany. It pays us better to concentrate upon limited high-class military objectives."* It will pay us better in the future, too. In a nutshell, the right policy will be to pick out the few categories of targets absolutely vital in war-waging today, and then—in the vernacular, and with no namby-panby about it—to give them the works.

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*Minute of 19th September, 1940, to General Ismay for the C.O.S. Committee, quoted in *Their Finest Hour,* 1949, p. 321.

CONTRIBUTORS PLEASE NOTE

ARTICLES FOR THE OCTOBER NUMBER MUST BE POSTED IN TIME TO REACH THE EDITOR:

(i) FROM SERVING PERSONNEL (to allow time for submission by the Editor to the Air Ministry, for official permission to publish the article) by first post on Saturday, 6th August, 1955.

(ii) OTHER CONTRIBUTORS by first post on Saturday, 13th August, 1955.

Articles should be addressed to:

THE EDITOR OF AIR POWER,
"CHASELEY", SOUTH CLIFF,
EASTBOURNE.

To assist in planning the lay-out of the Journal, they should be 1,100 words, 2,400 words or maximum of 4,000 words.

TWO YEARS WITHOUT STALIN

Some Further Reflections on Recent Changes in the Kremlin

BY SQUADRON LEADER J. F. L. LONG, M.A., R.A.F.

DESPITE all the demotions, dismissals, purgings, shootings and other swift changes that characterize the elaborate game of musical chairs now going on within the Kremlin, it is, I feel, still extremely difficult for most of us to adjust ourselves to the simple and really rather obvious truth that Joseph Stalin is dead and has been so for more than two years. Is it, perhaps, that the old man's ghost, like Hamlet's father's, refuses to quit the Kremlin cellarage and continues to haunt his chosen few (now one fewer than in his time) with far greater effect than the unhappy apparition in the play? The question is not, like so many that can be asked on this subject, a purely rhetorical one, even if, in the same breath as we ask it, we admit (as I think we must) that the outcome of the personal struggle for power in the Kremlin is still anybody's guess. For (to change the metaphor) Khrushchev may have gone in to bat, but we are none of us very sure of the bowling, or the condition of the wicket, or the attitude of the crowd, especially that part of it that hails from the country.

Unfortunately, as many forecasters have already found out, we cannot even be sure that the form on the last and only other occasion that this particular game was played, in the twenties, has any bearing upon the problem that faces us when we try to determine the name of the best batsman today. Nevertheless, a consideration of the length of time that it took to bring the last game to a conclusion should warn the sanguine among us against expecting an early finish of this one; and more, should help us, possibly, to isolate its decisive moment, or moments.

It is as well to remember that it took Stalin, a master manipulator, five years from the moment Lenin died in 1924 to achieve absolute control of the Russian Party-State; the decisive year, looking back, was undoubtedly 1926, to which, on a time basis, this year, 1955, corresponds. It was in 1926 that Stalin, temporarily allying himself in the Politburo with Bukharin, Tomsky and Rykov, split the opposition made up of Trotsky, Zinoviev and Kamenov, had Kamenov demoted and secured the promotion to full membership of the Party's ruling body three of his own nominees (Molotov, Voroshilov and Kalinin). At the same time he brought in useful reserves in Mikoyan and five other "safe" men as non voting members. Soon he was to turn on his former allies, Bukharin, Tomsky and Rykov (the so-called Right-Wing opposition), and crush them easily. By 1929 the struggle was over and the man whom Trotsky had previously assessed as a dangerous "mediocrity" and whom Lenin had wished, shortly before his death, to remove from the key post of Secretary-General of the Party, emerged as ruler of Russia.

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What changes have occurred in the Russian Party-State at the highest level since my last article appeared summarizing the position immediately after Stalin's death (ROYAL AIR FORCE QUARTERLY, Vol. 5, No. 3, pp. 245-50)?

The arrest and execution of Beriya aside, the most notable change, without doubt, was the removal of Malenkov by painless means from the post of

Chairman of the Council of Ministers (premier) last February and the emergence of Khrushchev, the First Secretary of the Party, as the most considerable force in the Party-State. Startling and sudden though this change seemed at the time, it had been long coming. Outspoken, bluff, practical, one whom many outside Russia had come to regard (and not without reason) as an ambitious and efficient plodder, this noisy colonial from the Ukraine had for some time been pretty sure of his position. Was it not last year, for instance, that he felt able to leave the centre and make an extensive tour of the Soviet Union and China? And long before, in August, 1952, two months prior to the 19th Party Congress in Moscow, it was he, not Malenkov, who announced the revisions to the basic book of rules to the Communist fraternity, the Party Statutes. Now, in February, 1955, with his conventional Stalinist plan for encouraging industrial production and his vast scheme for transforming in a year or so a lean Cinderella agriculture into a princess of plenty, he made his bid, unmistakably, for consideration as Stalin's true heir.*

There was considerable mystification in the West (and probably in Russia too) over the reasons which Malenkov offered in asking to be relieved of his post as head of State. The first, it will be recalled, was that his policy for agriculture had not been successful, and the second that he possessed insufficient experience of governmental work at the highest level to carry on successfully in his high office. Taken at its face value neither plea makes sense. The policy for agriculture in the Soviet Union has, since Stalin's death, quite clearly been Khrushchev's; while Malenkov's experience of work at the highest level has been as considerable as it has (from the Communist point of view) been impressive. Possibly this piece of calculated hypocrisy served both men well. Was not Khrushchev, perhaps, cleaning his own slate carefully at Malenkov's expense (an old Bolshevik custom); was not Malenkov remaining silent on the one essential point that distinguished his programme for heavy industry—the crucial matter in dispute—from Khrushchev's?

It was on this point, I feel, that Malenkov lost support of the most influential voices in the Party Praesidium, certainly Bulganin's and Molotov's, and probably Kaganovich's. (Mikoyan, it appears, backed Malenkov much of the way, but was rewarded ultimately with promotion for changing his mind opportunely. Which way the other members of the Praesidium swung is anyone's guess.) Malenkov, like Beriya, stood for encouraging a hard-worked and long-suffering Russian people to higher productivity in all branches of the economy, and particularly in heavy industry, by combining strong direction from the centre with more consumer goods in the average Russian home. He was not prompted, as has been suggested, by philanthropic motives, but by common sense. As Mikoyan made plain in an important and revealing speech more than a year ago, the increased flow of consumer goods planned by Malenkov would only be

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*It is an unusual note of authority that one detects in Khrushchev's many pronouncements. His immense report on agriculture, made to the Central Committee of the Party on 25th January, 1955, and broadcast by Moscow in full five days before Malenkov resigned, is typical in this respect. Said Khrushchev: "The only correct line for the all-round development of heavy industry was mapped out by the great Lenin and was steadily followed by the Party under the leadership of Stalin. This line is being steadily followed now *and it will be followed in the future.*" He castigated (in abusive Stalinian vein) "the ill-starred theoreticians" who were "trying to prove that at a certain stage . . . the development of heavy industry . . . ceases to be the main task and that light industry can and must outstrip all other branches of industry." These views, he said, were "an eructation of Right-wing deviation, hostile to Leninism, and were at one time propagated by Rykov, Bukharin and their ilk." This ugly reference to the former Right-wing opposition served as a curtain-raiser to his plan for Soviet agriculture! Its meaning would not have been lost on his audience. Bukharin and Rykov were shot in 1938.

maintained *if* productivity in heavy industry jumped up.* In the light of this the core of the dispute between the deposed leader and Khrushchev turns out to be something rather different from what Khrushchev represented it to be. This is *not* a dispute between one who supports the claims of light industries and consumer goods *against* one who champions heavy industry and producer goods (the investment figures alone for 1954 show how gross a distortion this view is), but a dispute about the best method for securing the desired upsurge in heavy industrial production. By my own reading of the copious evidence available, Malenkov was obliged to stand down because his plan for securing this upsurge was counted a failure on the grounds that it could not be achieved *except* at the expense of heavy industry. The implications of this imagined failure in such fields as external relations (China, Germany), strategic planning and nuclear development were insupportable—and Khrushchev, traditional Stalinist that he is, seized his chance.

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What inferences can one draw from the manner in which the struggle has been conducted so far? Two, chiefly. The first is that the exaggerations, distortions and understatements in the ideological and political battle-cries of those personally involved in the struggle for power throw a considerable light on the very nature of the struggle. The parallels and contrasts with the period 1924-29 are striking. It is noteworthy that none of the chief contenders for power today argues for any diminution in the Party's position of supremacy or for any change in the organization of the Party; nor does any one of them seek, as Beriya sought, to split the Party from top to bottom into warring factions. The personal struggle is being conducted within the remarkably resilient framework of the Party, and is concentrated at the moment at the summit. This would rule out, at least in the foreseeable future, a truly revolutionary situation developing within the Party, and, by implication, within the U.S.S.R.

The second inference removes any doubts that may previously have existed (some I entertained myself) about the actual status of the post of First Secretary of the Party. It is abundantly plain that the key post in the Party remains, in the absence of an appointment to the Secretary-Generalship, that of First Secretary. Once he abandoned that post to Khrushchev, and once the threat of Beriya to both contenders had been removed, Malenkov found himself unable to contain the man whose fingers were in contact with the levers that operated the whole Party machine. Malenkov's vast experience of that machine and his undoubted skill as a Party organizer availed him nothing. As if to emphasize the point, the much-publicized photograph of the Party leaders on the plinth in Red Square on May Day, 1955, showed Khrushchev standing in the centre, in Stalin's place.

What sort of system of control does Khrushchev find himself in charge of at the present time? To all appearance he finds himself at the head of a "divided system" which closely resembles that which Stalin operated during the thirties. That system, it will be recalled, left the formulation of policy entirely in the hands of the Party and its technical execution in the hands of the State. Stalin, in those days, held no executive office in the State. There have been no signs as yet, however, that Khrushchev favours a return to the 36-man ruling com-

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*See particularly an article of mine entitled "Stocktaking in Moscow," which appeared in *The Forces Magazine* for September, 1954. This article analyses the economic problems facing Malenkov in the May of that year.

[*By Courtesy - Sovetskiy* **Soyoz**

Khrushchev (in open neck Ukrainian shirt) at the opening of the U.S.S.R. Agricultural Exhibition last August. To his right, G. M. Malenkov, then Premier of the Soviet Union; to his left, I. A. Benediktov, then Minister of Agriculture, and V. M. Molotov, Minister for Foreign Affairs.

mittee, headed by a small bureau, experimentally operated by Stalin in the last six months of his life.* The Praesidium of the Party, with the exception of Beriya, remains unchanged in composition, although the order of precedence within it has fluctuated considerably since March, 1953. The order of the "full" or voting members at the moment appears to be: 1. Khrushchev; 2. Bulganin; 3. Kaganovich; 4. Molotov; 5. Voroshilov; 6. Mikoyan; 7. Saburov; 8. Pervukhin; and 9. Malenkov. Shvernik (in charge of the T.U. organization) and Ponamarenko (till recently Khrushchev's right-hand man in Kazakhstan and now Soviet Ambassador to Poland) remain "candidate" or non-voting members. Speaking generally, the fortunes of Nos. 1, 2, 3, 7 and 8 have improved; 4's and 5's have declined a little; 6's slumped badly just before Malenkov's fall, but recovered: 9's need no comment.

The relationship of the Praesidium of the Party to the Council of Ministers (or State cabinet) has been clarified considerably in the past six months and a very definite picture can be drawn. First, Malenkov's experiment with a small Council of Ministers of 25, notwithstanding the fact that it had certain inherent

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*See *The Royal Air Force Quarterly*, Vol. 5, No. 3, p. 247.

advantages over a big Council in the uneasy period after Stalin's death, was abandoned gradually after Beriya's arrest and completely after his execution. There may have been a connection between these two developments. The full Council of Ministers today numbers 65 ministers, or 13 more than in the last years of Stalin's life.

Secondly, although the size of the Council has been increased enormously its effectiveness as an executive committee has been safeguarded by a reversion to the Stalinist division of the Council into an inner, outer and full cabinet respectively, and by an increase in the number of co-ordinating super-ministers. In this way the voice of the Party Praesidium can be heard clearly by lesser ministers and its views acted on promptly. Thus, under the chairmanship of the new premier, Marshal Bulganin, sits an inner cabinet of five first deputy premiers made up of Kaganovich (economic affairs), Molotov (foreign affairs), Mikoyan (trade), Pervukhin (atomic and electrical power) and Saburov (planning). Each of these men, it will be noticed, is a *full* member of the Party Praesidium also. The inner cabinet in turn makes up the core of the outer cabinet of first deputy premiers and eight second deputy premiers, in whose ranks Malenkov now appears (as Minister for Electric Power Stations). Other interesting recent appointments are those of Lobanov, an agricultural expert, and Khrunichev, a former Minister of the Aviation Industry. Between them the first and second deputy premiers co-ordinate the work of some 50 ministries. A typical example is second deputy premier Malyshev, a machine-building expert, who now co-ordinates the work of no fewer than six machine-building ministries.

Thirdly, there has been a sharper differentiation of duties of individual ministries than at any time since 1917, as well as a more flexible approach, so far as one can judge from the many changes reported, to questions of ministerial and industrial organization. Fourthly, except that an outstanding professional soldier has gone to the Ministry of Defence, there has been no significant advance by the professional soldiers, airmen and sailors to the Party summit. The inference that Marshal Zhukov now stands fifth in the hierarchy (suggested by a diagram appearing in a recent issue of *The Economist*) is, to my knowledge, quite without foundation. No professional soldier sits in the Party Praesidium or, for that matter, in the inner or outer cabinet. The subordination of the military has, once again, been nicely allowed for.

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This brief sketch of some of the more important developments at the summit of power in the U.S.S.R. in the past two years would not be complete without a straight answer to a question that is on all our minds: Are we likely to see more and even bigger changes in the leadership in the next two or three years? On the present showing, I would say that we are. The situation at the top is far from stable. The problems that face the new leader are far from easy. He himself is an impetuous man and his promises are never small ones. His speeches, exhortations, orders and reprimands are bold; so are his actions: but one still hesitates to credit him with the all-round capacity for the role he clearly sees is his to play. There seem strong grounds for believing that only really outstanding qualities of leadership (of the ruthless Bolshevik sort) will enable him to prevent new groupings of powerful men beneath him. It is, as has been shown so plainly recently, one thing to stand in Stalin's place, quite another to occupy his seat. And yet one would do well to ponder the relevance of Trotsky's verdict on Stalin. Is Khrushchev another "mediocrity"?

THE PATTERN OF SOVIET DOMINATION

By Flight Lieutenant J. W. Duckworth, b.a.

IN 1955, nearly ten years after the end of the Second World War, in which the Western Allies and the Soviet Union were somewhat reluctant bedfellows, it is a useful and instructive mental discipline to sit back and reconsider some of the events that have led up to the present impossible situation in world affairs.

The question we have to ask ourselves is this: Has the Soviet Union followed a deliberate policy of estrangement from, and hostility towards, the West or has it merely pursued a policy of expediency, stepping in where the West was weak and trimming its sails according to the strength of the wind of freedom? On the answer to this question, I think, depends a great deal, perhaps the future of our present civilization. If the Soviet Union is following a carefully planned programme for the domination of the world by Communism, then the chances of its provoking a major conflict with the Western Powers are immeasureably greater than if it were merely carring out a more orthodox Great Power diplomacy for the benefit of the Soviet State. In this latter case the threat to our independence, though potent, is not inexorable.

An examination of Soviet foreign policy since the war will, I think, show that the second of the two hypotheses is the more likely to be true.

Russia, alone of the Great Powers who won the war, increased her frontiers at the expense of the enemy and satellite states. Petsamo, Karelia, Viipuri, the Baltic Republics, North-East Prussia, Eastern Poland, the eastern tip of Czechoslovakia, Bessarabia, Inner Mongolia, Southern Sakhalin and the Kurile Islands have all been incorporated within the boundaries of a Greater Russia. Before we adduce this as evidence for a Communist plot against the Western World it would be as well for us to examine the frontiers of the Holy Russia of the Czars in the period before 1914. The map would show that what the Soviets have indeed done is to reclaim for their Motherland those areas which were lost during the Russo-Japanese War of 1904-5 and the First World War. There is in this aggrandizement less of a Communist threat than a prime example of "Realpolitik." In fact the Soviets have flown in the face of their own oft-proclaimed dogma of the sanctity of other nationalities.

It is in this action that we can see the paradox of the Soviet state, built on the theory of equality of all men, expanding its frontiers at the expense of reluctant but defenceless neighbours, all in the interest of Holy Russia.

The paradox is, of course, explained by a closer study of Russian history, both before and after the Revolution of 1917. Pre-revolutionary and post-revolutionary Russia are linked by strong bands of continuity. In short, the expansionist policy of Czarist Russia is being carried on by the Communists with greater momentum because of the driving force given to it by the world Communist movement, which blindly believes that it is working for a world, and not merely a Russian, valhalla. Five examples will prove this continuity:

(i) All great reforms in Russia have been imported from the outside world and forced on the Russian people from above, e.g.—

(*a*) Christianity was made the religion of Russia in the eleventh century by Vladimik the Great.

(*b*) Western techniques of industry and government were forced on the Russians in the eighteenth century by Peter the Great.

(*c*) Marxism, the product of Western thought, was studied and imported into Russia by Lenin and his band of professional revolutionaries.

(ii) The despotism usually associated with Communist rule in Russia is not, however, a Communist invention: it has always been the mainspring of the Russian governmental system. As in the old days, paradoxically, the peasants addressed their prayers to the " autocrat of all the Russias " and pleaded with the " Little Father " for relief from the tyrannical rule of their overlords, so in recent times the peasants called on " Father Stalin " to save them from the oppression of the local commissars.

(iii) The Orthodox Church, which arouses amazed contempt among Western Churchmen, is, of course, a state department of religion. This has always been so from the eleventh century. It is interesting to note that even the Bolsheviks were forced to reopen the churches during the height of the struggle against Hitler and encouraged the people to pray for victory. Victory came, but to whom was the honour accorded?

(iv) The efficient, omnipresent State Police is the Czarist secret police writ large.

(v) The imperialism of the Communists was indeed surpassed by that of the Czars. As stated previously, the Soviets have merely redrawn the frontiers of the Union along lines already laid down in the late nineteenth century. It was only during this period that the Russians colonized for the first time the Far Eastern Provinces of Asia along the Pacific coast, and probed down into Central Asia along the Indo-Persian frontier.

Having traced these dominant threads in the continuity of Russian history let us now look at post-war Russian foreign policy in order to extract from it whatever evidence there is of a carefully premeditated plot to subvert the Free World in the interests of universal Communism. The fake war-time honeymoon of the West with Russia was never really consummated and soon broke down. The Russians, for their part, showed every intention of remaining in Central Europe.

Why? Was it fear and mistrust of the West or a deliberate policy aiming at future aggression? Was it merely a continuation of Czarist imperialism or revolutionary zeal? Was it indeed a plan or merely an expedient?

The answer is not clear cut. Fear and aggression went hand in hand. The Russians were afraid of the economic power and military might of the United States, whose cities lay inviolate behind thousands of miles of ocean whilst the smoking ruins of Russian cities stretched for hundreds of miles behind her frontiers. Whilst the Red Army had marched into Germany on Russian boots it had ridden on American lorries. Without American technical assistance the Red Army would have been virtually immobilized. Most important of all, the Americans possessed the atom bomb, which potential threat served to strengthen the Russian fear of another capitalist encirclement of the Soviets and a possible second period of intervention against the Revolution. In fact the Russians were victims of their own subtle propaganda. For them no good could ever come out of evil, and capitalism was evil—Marx, Lenin and Stalin had all said so. Therefore the Russians were afraid in 1945, but when they saw the great armies of the West disbanded with almost indecent haste and precipitately pulled out of Europe they took heart and consolidated their forces in Central Europe on the weakness of their erstwhile allies. The Red Army, which had carried Communism into Europe on its banners, was now used to prop up satellite regimes in the Eastern European countries.

Proof of Russian expediency is revealed by their treatment of Eastern Germany, which was occupied and devastated in the interests of the Soviet Union. War plants were dismantled and hurried across Europe to the Soviet Union. Thus in a short time the military and economic potential of Eastern Germany was destroyed and the country forced into subservience to the U.S.S.R. When the Soviets realized that their stay in Europe was likely to be a long one they reversed the process and began to build up Eastern Germany as the bastion of their new Empire. The flow of goods now ran in the opposite direction.

Meanwhile the Cold War was intensified. Maxim Litvinoff, the pro-Western Foreign Commissar, was sacked. A period of probing around the Iron Curtain for Western weaknesses followed. In Azerbaijan, when the Western reaction in the United Nations appeared too strong, the Russians withdrew their forces from Northern Persia and sought pickings elsewhere.

The Cominform was founded in 1947 as an organization to bind together the interests of the satellite states in Eastern Europe with those of the Soviet Union.

The West reacted vigorously with the Marshall Plan, aimed at feeding the people and diminishing the enormous trend towards Communism in Western Europe. The Berlin Blockade, the zenith of the Cold War, followed. The Czech coup in 1948 marked the end of Western illusions about a possible withdrawal of the Russians from Europe but the success of the Soviet here was counterbalanced by the defection of Tito in Yugoslavia. The breach in the hitherto monolithic façade of the Russian Empire was important for illustrating the resolve of the Russians to be masters in their own house and to brook no "deviationism" amongst the satellites.

The course of events in the Far East now took the front page and here we have incontrovertible evidence that the Soviet leaders were caught napping. The secret talks published by the Yugoslavs reveal that the Kremlin had staked its money on Chiang Kai-shek and had advised the Chinese Communists to go along with him until they were strong enough to break up the Kuomntang from within. Mao received this advice with his tongue in his cheek and went back to China to organize the armies that threw Chiang off the mainland and into Formosa. Thus the Chinese People's Republic entered the scene, not as a puppet but as an ally and as heir to the Revolution.

The Korean crisis revealed once again the absence of any Russian plan, indeed the Russians were caught completely unawares as their representative was not even present at the Security Council meeting which voted to send United Nations forces under American command into South Korea. Thus the veto was not used and for the first time really united action was carried out in the cause of world peace.

Finally, we must not dwell too much on Russian successes but look at their defeats. When Stalin died, although he bequeathed to his heirs a world nearly one-third under Communist rule, in the remainder never before had the forces of freedom been so well organised in time of peace against possible aggression.

His successors evidently felt that his policy had strengthened rather than weakened the West. A notable period of relaxation followed. The Korean war was settled, allowing the United States to withdraw its main forces and deploy them in a more advantageous position. Remember that in this war no Russian forces had been committed, and if the Russians had really been bent on world revolution they would have been strongly inclined towards letting the U.S.A. and its allies sink deeper into the Korean morass whilst remaining uncommitted themselves. In Indo-China similarly the Russians appear to have forced Ho-Chi-Minh to accept less than he militarily deserved.

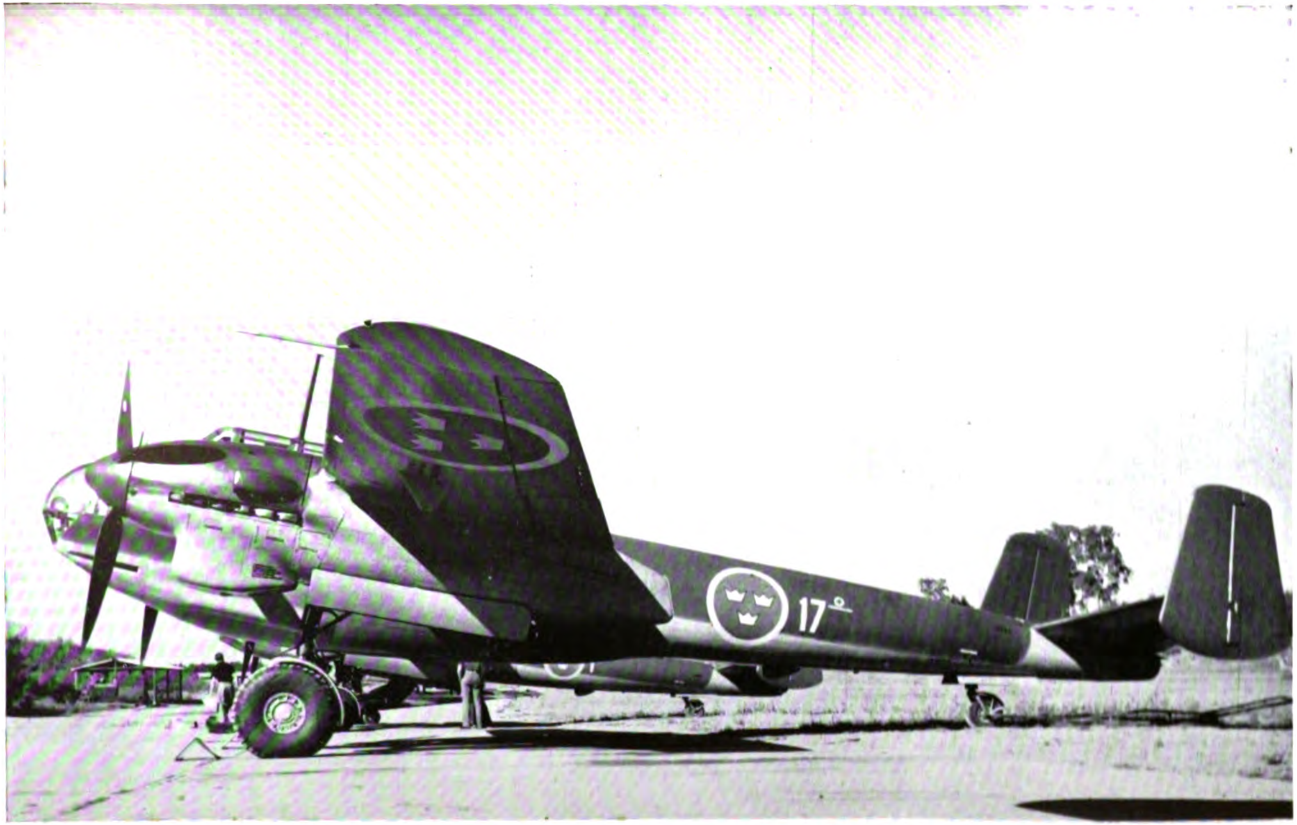
From this evidence it is possible, I think, to draw some broad conclusions:

(1) The Soviet Union has shown itself only too willing to take advantage of Western weakness, but has hitherto stopped short of full scale war.

(2) The West is now in a strong and well armed position from which it could devastate the Soviet Union.

(3) The Russians have no plan of campaign for the conquest of the world in the name of Communism, but merely a policy of aggrandizement at the expense of the West where there is no chance of war.

(4) Finally, the moral to it all must surely be that we would be foolish to attempt to bargain with the Russians from anything less than a position of overwhelming strength. The possession of the hydrogen bomb and the ability to deliver it at will when required will give us that position in the world.



SAAB T18B.

THE ROYAL SWEDISH AIR FORCE

[*By courtesy of the Commander-in-Chief, R.S.A.F.*]

THE history of the Royal Swedish Air Force began, like that of the British Royal Flying Corps, in 1912, when the Swedish Diet decided to provide money to train three officers, one N.C.O. and two mechanics at flying schools in France. In the same year, the Army received its first two aircraft, one of which was a gift from the Swedish Aeronautical Society; and in 1913 the Flying School of the Royal Swedish Navy was started with three aircraft, one again presented by a private donor.

After this modest beginning, the number of aircraft and aircrews gradually increased until, in 1925, the Diet proposed that the air units should be combined to form a new independent Service—the Air Force. This resolution was carried into effect in 1926; and Sweden thus became one of the first nations to possess a separate air force.

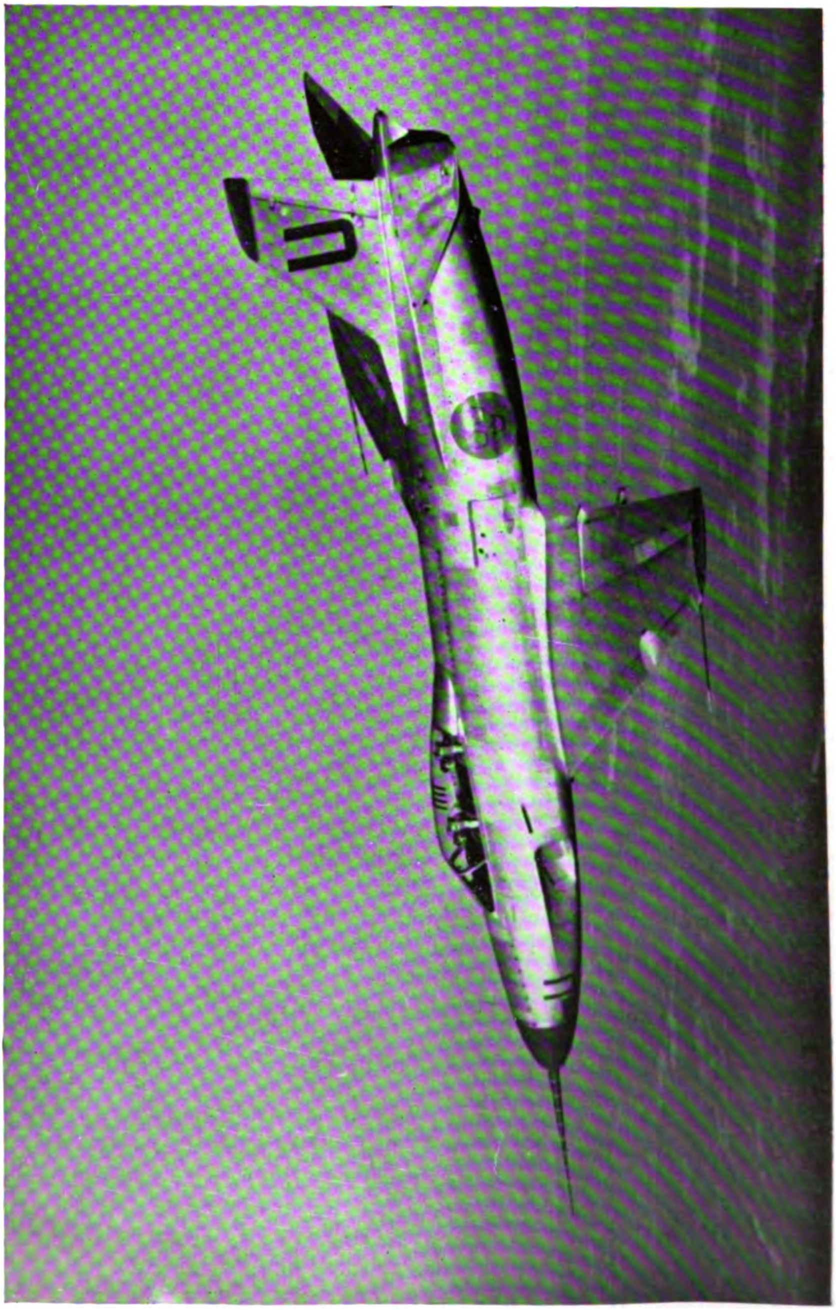
Expansion of the new Service was slow at first, because very little money was made available to it. But, as a result of growing political unrest in authorized a considerable increase in the strength of the Air Force. The aim was to build it up to 12 bomber squadrons, 3 fighter squadrons and 6 reconnaissance squadrons, with a total of 257 combat aircraft, supported by an enlarged flying-school.

Initial war reports in the autumn of 1939 proved, however, that the proposed reorganization was not sufficient. Sweden's geographical situation, reports from the Finnish-Russian winter war, and lessons from the other theatres of war were strong arguments in support of futher development of the R.S.A.F. and, during the years 1940-42, the Diet decided on considerable reinforcements.

One of the major problems during this period of major development was the procurement of equipment. Sweden had no aircraft industry worth mentioning, having always filled its requirements for combat aircraft from foreign sources. During the war, such purchases could not be made, because the usual suppliers needed every aircraft they could manufacture to meet their own war demands. Consequently, it became necessary to start a Swedish aircraft industry, and the SAAB Aircraft Company was founded. This enterprise is still growing and has now attained an impressive capacity, as has the aero-engine plant S.F.A.

SAAB quickly began the design and production of both fighters and bombers and, combined with engine production at SFA, the Swedish Air Force began to receive equipment for a growing number of new squadrons. In the emergency the Royal Swedish Air Board also designed a fighter aircraft of its own and, by the end of the war, the R.S.A.F. had reached a strength of 21 fighter squadrons, 21 bomber (attack) squadrons and 9 reconnaissance squadrons. It had also considerably increased its training organization.

Main duty of the R.S.A.F. during the Second World War was to mount guard over Sweden—a task which placed heavy and varied demands on the young air arm. Swedish fighter units intercepted and turned away a great number of aircraft which attempted to intrude over Swedish territory; while Swedish reconnaissance units kept watch continuously over coastal areas and acted as escorts to seaborne traffic. Indeed, many well-informed military spokes-



SAAB A32 LANSEN.

men are of the opinion that the rapidly growing strength of the R.S.A.F. contributed largely to the country's ability to maintain its policy of neutrality.

ANGLO-SWEDISH AIR FORCE RELATIONS

The bonds between the Royal Swedish Air Force and England and its Royal Air Force have been many and close, both before and after the second World War. Throughout its history, a considerable number of its combat aircraft have been bought from England, including the Bristol Bulldogs, Hawker Harts (Bristol engines) and Gloster Gladiators of the thirties; and, post-war, de Havilland Mosquitoes, Vampires, Vampire trainers, Venoms, Supermarine Spitfires and Hawker Hunters. Now a British transport aircraft, the Hunting Percival Pembroke, is also being delivered.

A number of leading Swedish Air Force officers have profited from training courses with the Royal Air Force, both before and since the war. The present C-in-C., Lieut.-General Axel Ljungdahl, was a student at the School of Army Co-operation in 1934. Many other Swedish officers have attended courses at the Royal Air Force Staff College, the Empire Test Pilots School, the Central Flying School and the School of Land/Air Warfare.

Since the war, a number of reciprocal visits have been made by both senior officers and complete Air Force units. On three occasions Swedish Fighter Squadrons have visited the Royal Air Force, and these visits have been returned by British squadrons. In the last four years there have also been exchange visits by air-minded young men of the two countries, in which the Air Training Corps have acted as hosts in England, while in Sweden the boys are the guests of the Swedish Air Force Command.

THE ROYAL SWEDISH AIR FORCE TODAY

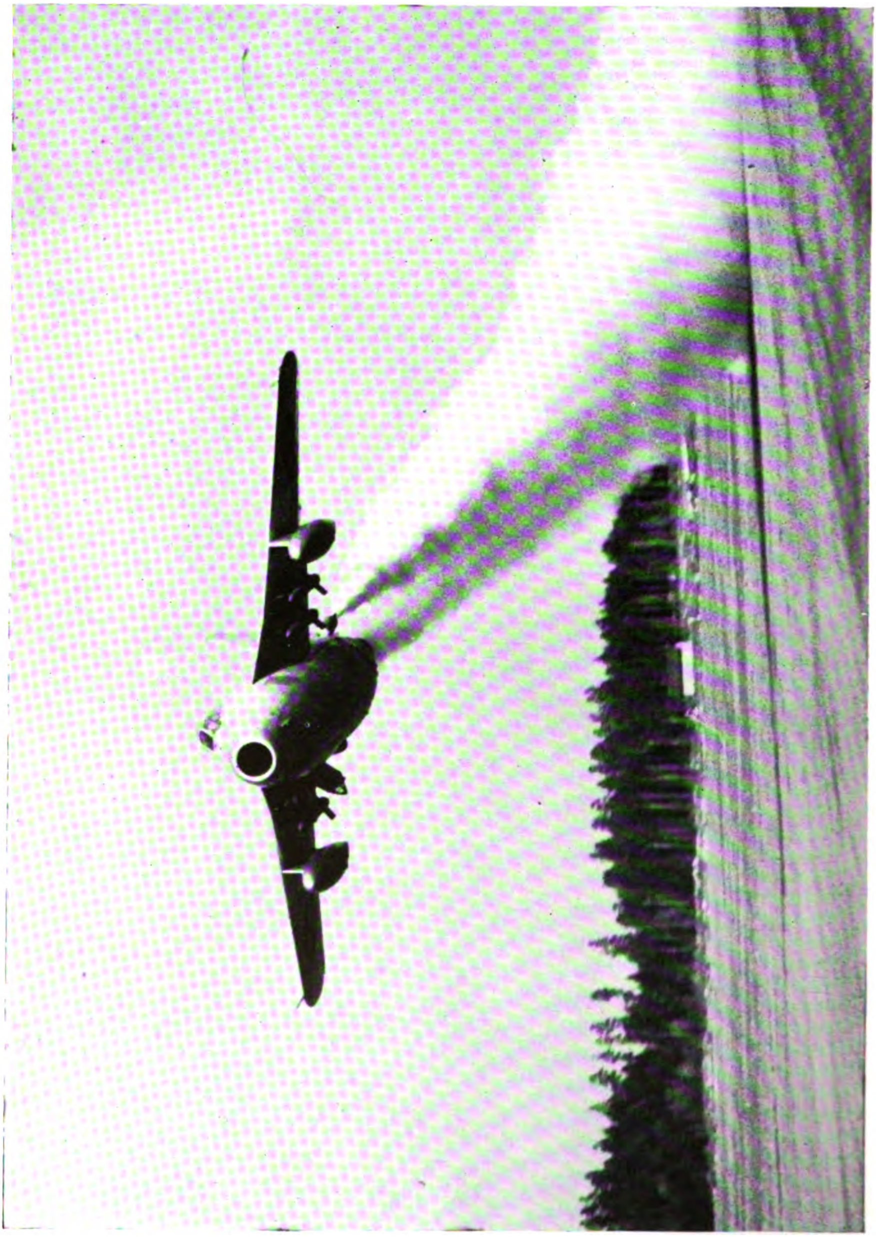
The lessons of the Second World War showed the need for some changes in the overall composition of the Air Force, putting greater stress on the Fighter Arm and involving other changes compared with what had been decided during the war.

So, in 1955, the R.S.A.F. contains 30 day-fighter squadrons, 3 night-fighter squadrons, 12 attack-bomber squadrons and 5 reconnaissance squadrons. In addition there are the flying training units—the R.S.A.F. Flying School at Ljungbyhed and the R.S.A.F. Air Cadet School at Uppsala—together with the Air Staff College for advanced studies, the Bombing and Gunnery School, the Central Training Schools for general training and education of N.C.Os. and technical personnel, and the Radar School. The air material is handled by Maintenance Depots.

Since 1948 the Control and Reporting System has been incorporated in the Air Force organization, and this service is now being extensively modernized. Control Centres and a large number of hangars have been blasted into solid mountain rocks; so the R.S.A.F. is well prepared even against possible future attacks with nuclear weapons.

THE MOST IMPORTANT OF THE AIRCRAFT TYPES NOW IN USE

For a number of years the Fighter Arm has been equipped exclusively with jet aircraft. Most squadrons now have the SAAB-designed and manufactured J29, which is nicknamed the "Flying Barrel" because of its rotund shape. But its tubby appearance is deceptive, for the J29 has a maximum speed of more



SAAB 29 takes off with heavy r.p. and drop tanks.

than 650 m.p.h. and its performance is considered to rank with that of the F-86 Sabre and the Mig-15.

A few day-fighter units still fly the de Havilland Vampire, but this aircraft will soon be replaced by the Hawker Hunter. The night-fighter units are already equipped with de Havilland Venoms.

A few of the attack-bomber units are still equipped with SAAB B18 twin-engined propeller-driven aircraft; but this branch of the Air Force, too, will soon be converted entirely to jet propulsion. Some units have the de Havilland Vampire adapted for attack missions, but the majority of the attack aircraft are SAAB A29's, the bomb and rocket carrying version of the J29. Before long, all attack units will be provided with the new SAAB A32 Lansen, which has a maximum speed exceeding 685 m.p.h. and will form an offensive weapon of great power.

Reconnaissance units of the R.S.A.F. are now being provided with the reconnaissance version of the J29, designated S29C. A few SAAB S18 aircraft, developed from the B18, with early warning radar, will however be retained for a time for maritime patrol.

MAIN FEATURES OF THE FLYING TRAINING OF THE R.S.A.F.

The flying personnel consist mainly of regular officers and N.C.Os. The latter are recruited for short service periods of 6 to 7 years; but many of them are able to become regular officers by taking an educational programme arranged by the Air Force, followed by a course at the Cadet School.

The flying training starts with 10 months at the Flying School at Ljungbyhed. Here the cadets learn normal and aerobatic flying, instrument flying, formation and night flying, on propeller-driven SAAB Safir and AT-6 Harvard basic trainer aircraft. During the last two years certain groups have, by way of trial, been trained on Vampire trainers and Vampires. The experiment has turned out so well that the Harvard is to be wholly replaced by these types.

After basic training the young pilots are assigned to various combat units for tactical training. During this time they fly combat aircraft and are taught methods of air combat and attack against ground targets, gun firing, rocket firing, bombing, etc. This second period lasts for about one year, after which the two categories of personnel are separated. The cadet—those who have passed a matriculation examination—enter the Cadet School, while the short-service pilots remain at the wings.

At the Cadet School, the cadets study theoretical subjects for one year and at the same time undergo a comparatively extensive flying training. The future officers learn how to lead Air Force units and, when the course at the Cadet School is completed, pass their officers' examination after a total training time of three years. They are then assigned to combat units.

TREND OF SWEDISH DEFENCE DEVELOPMENT

Sweden still pursues its traditional policy of neutrality, which is essentially based on the maintenance of a strong defence. As the country belongs to the small nations and its economic resources are limited, the defence planning is characterized by most strict economy and rationalization. Thus, the Swedish Air Force is administered by a comparatively small body of personnel both in staff posts and at Air Force Stations, bearing in mind the number of combat aircraft in service.

With regard to its material, the R.S.A.F. prefers quality to quantity. Thanks to good Swedish designs, combined with purchases from abroad, the equipment of the Service compares favourably with that of major foreign air forces, although, as in other countries, division of the defence budget between the Services has always been a problem.

In the autumn of 1954 the Swedish Supreme Commander submitted a National Defence Plan for the next ten years, which was worked out jointly by the three Services and recommends among other things a further strengthening of the R.S.A.F.

The plan calls for an increase in the present number of aircraft—without setting up any new Air Force Units—to raise the fighter strength by 18 per cent., attack aircraft by 54 per cent. and the total number of aircraft by 22 per cent. During the same period the Air Base system will be developed and made more up-to-date. In this way, those responsible for Swedish Defence* have stressed unanimously their belief in the present and future importance of Air Power—an opinion which is reflected in the defence planning of the great Western Democracies.

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*The Swedish Defence Directorate.

A REALISTIC ARCTIC STRATEGY

By Squadron Leader Peter W. Ellis, D.F.C.

AN EXAGGERATION

LATELY there has been much written about a "new vital strategic area," the Arctic. It is suggested that the ability to fight and fly in this area is indispensable to Western security. This is an exaggeration which has probably grown from the layman's realisation that there are other maps besides the conventional Mercator's of his schooldays. Projections showing America and Russia facing each other over the North Pole are now fashionable. It is necessary that we in Great Britain are not misled. The strategic importance of the Arctic must be realistically appreciated as Britain can only afford the essentials of war; there is no money for extravagance.

Strategy is the art of projecting and directing the larger military movements and operations of a campaign. First we must determine what will be the major military operations in the only likely form of hot war, one with America and Russia as the chief combatants. Then it should be considered how this overall strategy affects the Arctic. In order to minimize fantasy, the time period should be restricted to the immediate future, before the era of unlimited range guided missiles.

COLD WAR

Beforehand, however, it must be realised that the building in the Arctic by the Russians of railways and towns, and by the Americans of airfields and radar stations, is unlikely to provoke minor peripheral wars. The Arctic is a large, empty, undeveloped region, and there is ample room for all the interested parties to exploit their territory with little risk of conflict. There are no masses of primitive people on whom it is worth while waging ideological war. The only "cold war" likely to be fought is against nature, not man. This will be a hard fight; the operation of aircraft, fighting equipment and men in the extreme cold creates many difficulties which can only be overcome by complicated and expensive techniques. To make Arctic warfare worth while some potent military advantage must be gained thereby.

HOT WAR

Whether begun by design or accident, it is fairly certain that in the next hot war the major military operations will be as follows:

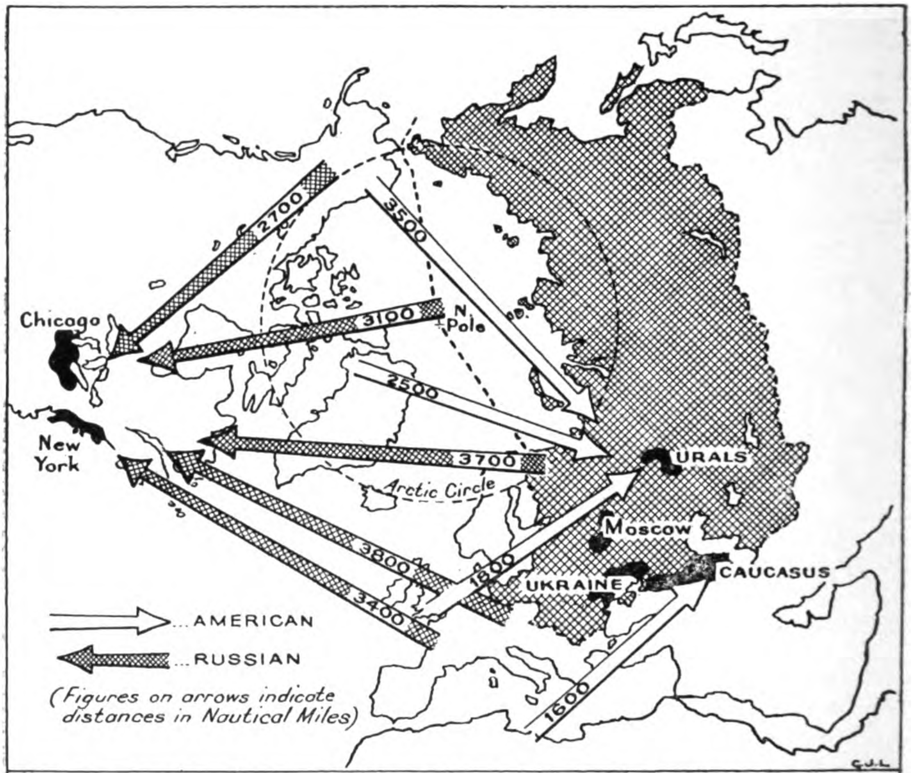
(a) America and Russia will immediately launch a strategic bomber offensive against each other's main industrial centres and strategic bomber bases.

(b) At the same time Russia will invade Europe.

The duration of war will depend on the capacity of the two major combatants to absorb thermo-nuclear punishment. If, as seems unlikely, it lasts for several weeks, not days, then in order to stem the Russian land offensive and maintain strategic bombing momentum, America will need secure sea communications serving Europe.

THE AIR BATTLE

How does this affect the Arctic? First consider the opening, possibly



DISTANCES AND ROUTES BETWEEN MAJOR INDUSTRIAL TARGETS AND BOMBER BASES

decisive, air battle. The Russian long-range air force at present consists of T.U.4's, piston-engined bombers similar to the obsolescent American Super-Fortresses. The T.U.4 could probably carry an atomic bomb to a radius of action of 2,000 nautical miles. By about 1960 the Russians are expected to have many of the inter-continental bombers, publicly shown for the first time at this year's May-day parade. The popular press, a reasonably reliable intelligence agency, supposes that the May-day bomber could operate to a radius of action of about 4,000 nautical miles.

The Russian bomber's target, American industry, is mainly about New York, Philadelphia, Cleveland and Chicago. Even today, when considering the striking power of a bomber force, range is still, and may be until the guided missile era, a limiting factor. The shorter the distance to the target, the greater the bomb load and, what is more important, the ability of the bomber to feint and deceive or avoid the enemy defences. Therefore the Soviet bombers would probably operate from bases as near as possible to America's industrial complex. If situated in Eastern Europe or Arctic Russia, these bases would be about 3,800 nautical miles away. In order to avoid enemy Europe, the Soviet long-range air force might prefer to operate from the Arctic bases and fly over the North Pole.

America's Strategic Air Command now has a large force of B-47 jet bombers. Soon they will have the even more effective B-52. These aircraft can probably carry the hydrogen bomb up to a radius of action of 5,000 nautical miles. S.A.C.'s targets, the important Russian industrial areas, are about the Urals, Moscow, the Caucasus and the Ukraine. Russia has other smaller industrial areas and she is attempting to develop industries in Northern Siberia; nevertheless, during the immediate future Russia will be most reliant on these four old-established industrial regions. Although America has aircraft with sufficient range to attack, from the heart of the United States over the North Pole, Russian industries 5,000 nautical miles away, whenever possible S.A.C. would operate from bases much nearer to their targets. Airfields in Western Europe and the Middle East are only 1,000 to 2,000 nautical miles away from the major Russian industrial centres.

Attacks against industry would only be part of the opening air battle. Of more immediate concern would be attacks on the thermo-nuclear bomber bases. Obviously the Russians would concentrate their counter-bombardment attacks on the S.A.C. bases which could hurt them the most, those in Europe and the Middle East. The Americans would do likewise; their main counter-attacks would be against the Soviet bomber bases in Eastern Europe or Arctic Russia. However, the more westerly Arctic airfields, those about Murmansk, would probably be attacked by S.A.C. aircraft operating from Western Europe, the nearest Allied base area.

So far it is apparent that in a short hot war the operation of strategic bombers from Arctic airfields would be limited. Today the Soviet Air Force lacks an aircraft capable of attacking American industry without resorting to suicidal one-way missions. The T.U.4's would mainly operate in Europe and the Middle East. Later, when the S.A.F. has inter-continental bombers, and some of these might operate from Arctic Russia in order to avoid Western Europe's air defences. The United States Air Force would probably operate most of their inter-continental bombers from European and Middle Eastern bases. They would only operate from the Arctic in order to attack any threatening North Siberian airfields which could not be efficiently hit from warmer and more convenient bases.

THE LAND BATTLE

To complete a study of future strategy we should consider the unlikely event of a thermo-nuclear war lasting long enough for land battles to affect matters. The main aim of a Russian invasion of Europe would be to overrun the American S.A.C. bases and at the same time move her own bombers nearer, to within 3,400 nautical miles, of the New York/Chicago complex. In this case, S.A.C. would be forced to operate from America and fly over the Arctic to Russian industries 5,000 nautical miles away. However, if based in Alaska or Greenland, the bombers would be only 2,000 nautical miles to 4,000 nautical miles from the main Russian industrial regions, a worth-while saving in flight distance.

There are other, perhaps easier, ways for Russia to move her bombers nearer to American industry. She could invade nearby Alaska, less than 3,000 nautical miles from the New York/Chicago area. Easiest of all, Russia claims all the territory on her side of the North Pole between Murmansk and the Bering Straits; in peace she could build advanced staging and refuelling bases for her bombers on the polar cap, also only 3,000 nautical miles from New York/Chicago. Today Russia has a few scientific stations on the polar cap and on floating ice islands; at present they are mainly used for taking weather observations.

If America built similar advanced bases on her side of the North Pole, they would be no nearer to Russian industry than Western European airfields. Nevertheless, the United States Air Force is now investigating the feasibility of flying from temporary ice strips on the polar cap, no doubt as an insurance should Europe be lost.

COMMUNICATIONS

Lastly, the movements aspect of Arctic strategy; this also would only apply to a comparatively long war. Because of the naturally restricted land and sea communications, air transport would play a big part in supplying Arctic air bases, especially any built on the polar cap. Thus naval fighting would be more limited in the Arctic than elsewhere. America is unlikely to bother much about the Russian North-East Passage; these sea routes are already severely obstructed by ice, and alternative railways are being built. Perhaps the only notable naval actions in the Arctic would take place underneath the sea lanes between America and Greenland.

COLD STRATEGY FOR A HOT WAR

Thus it is concluded that the following are the important points regarding Arctic strategy for a hot war:

(a) The Arctic might become a transit area, an air ocean for long-range thermo-nuclear bombers. It would probably be narrowed by America and Russia building advanced refuelling or staging bases on the polar cap.

(b) America's greatest need to use this ocean would occur if Europe were lost. In which case, in order to shorten the journey to the target, S.A.C. might operate from Alaska or Greenland.

(c) Russia cannot use the ocean at present. When she has an intercontinental bomber, the Soviet long-range air force might operate from Arctic Russia until Western Europe were captured.

(d) Russia might invade Alaska, especially if she met stiff resistance in Europe. Her aim would be twofold: to move her bombers nearer to their target, and to divert American attention from Europe.

(e) As an insurance, both America and Russia need ready air defences covering their Arctic flanks. Therefore they must position fighter bases and radar stations in the Arctic.

At present we in Great Britain need bother little about Arctic warfare. In the next hot war we will first have to fight in Europe and the Middle East, theatres of more immediate and vital concern to us. If we lose the second Battle of Britain, then that is the time to concern ourselves with the Arctic. In which case we could justifiably ask our American and Canadian allies for any advice needed.

FLEET-BASED FLYING-BOAT BOMBERS

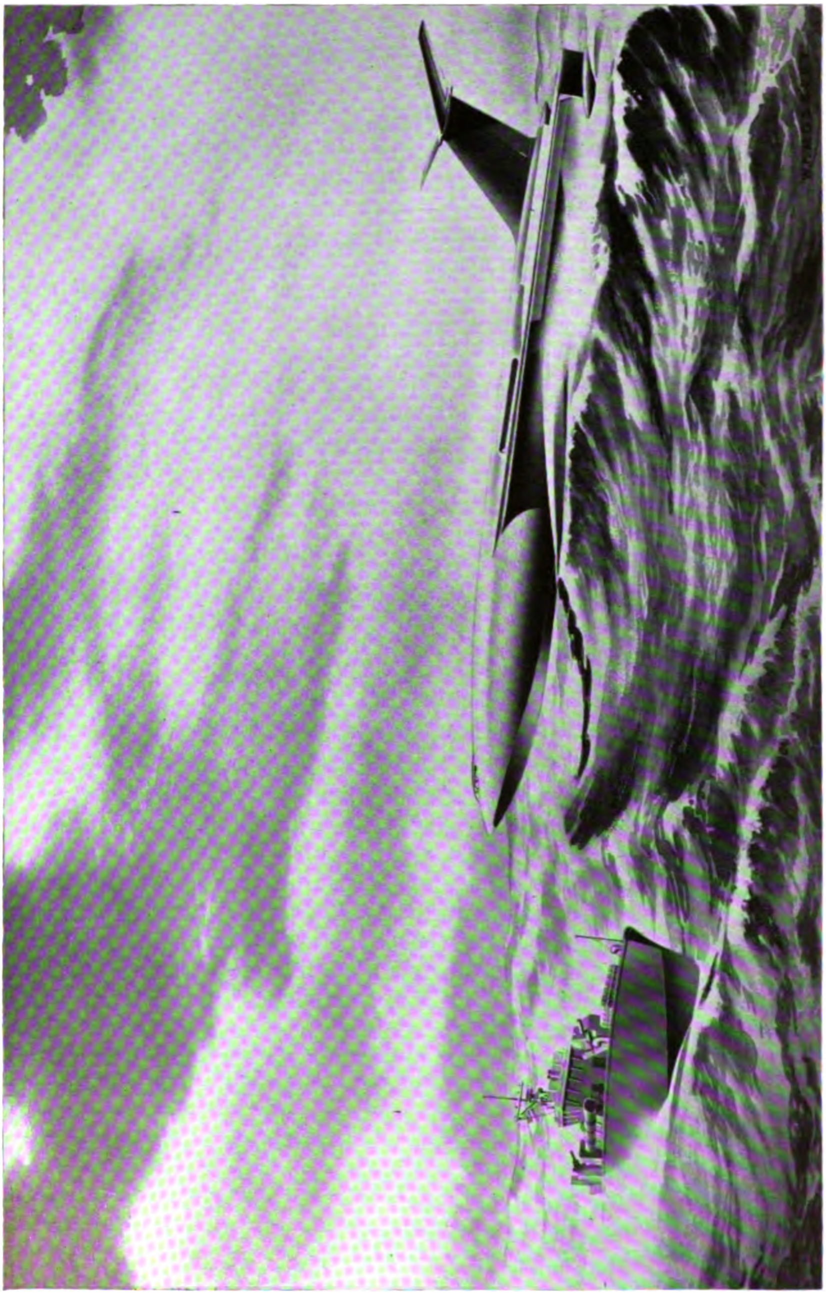
By Group Captain D. W. Baird, A.F.C., R.N.Z.A.F.

IN Great Britain there has been no development in military flying-boats for many years, and the Sunderland, a twenty-year-old design, still serves the Royal Air Force and other services in the maritime reconnaissance and anti-submarine role. The reason that the Royal Air Force has not obtained a Sunderland replacement is probably because the maritime role can be undertaken by the Shackleton and Neptune land-planes from some of the many aerodromes created during the war and in suitable strategic positions from which to cover focal shipping areas and sea lanes to the United Kingdom. It is likely also that the Sunderland cannot be operated economically or efficiently in comparison with her so-much-younger land-plane sisters. It is not practical to compare a flying-boat which has been in service for seventeen years with modern land-planes designed after the accumulated experience of five years' submarine warfare.

The case for the "boat" has at times been based on a comparison of the relative merits of land-planes and shore-based flying-boats equally equipped for the task of controlling the sea communications in partnerships with naval surface vessels. The case makes little headway, for the land-plane is in being and operated from adequately equipped bases. The flying-boat is only on paper, and its ancient parent is coping with bases fundamentally unsuited to her nature. There appears to have been little comment by flying-boat champions on the unsuitability of the operating areas in the United Kingdom. This factor and the doctrine of first things first are thought to be the basic reasons why no Sunderland replacement has yet been made. The flying-boat of over a decade ago cannot operate efficiently from inadequate bases and there is no money to develop a replacement—bombers, fighters and guided weapons are more important in the atomic age.

What is wrong with Britain's flying-boat bases? A cursory review indicates that the United Kingdom is not by nature suitable for the operation of reasonable numbers of military flying-boats designed, like the Sunderland, to operate from long stretches of sheltered water. Mount Batten is too small; Calshot and Felixstowe are strategically ill placed; Pembroke Dock has a rise and fall of over 25 feet, and the operating area is a long way from the shore; Castle Archdale is logistically difficult. These are some of the very real reasons why flying-boats are not able to compete with land-planes in the United Kingdom unless equally large sums of money are spent on creating their bases. In the United Kingdom there are no "naturals" for flying-boats like Corpus Christi in Texas, Banana River in Florida, Kaneohe Bay in Hawaii, Lauthala Bay in Fiji, or Mechanics Bay in Auckland. These sheltered areas, and many others including lagoons and coral atolls, provide ideal operating bases in the Far East, the Indian and Pacific Oceans and in American waters.

Where the natural flying-boat alighting areas are available, there the boat can do the maritime reconnaissance and anti-submarine role as economically as the land-plane, and because it can undertake additional secondary missions denied to the land-plane it can be more efficient. These missions include search and rescue, if necessary picking up survivors from the sea at considerable distance



[Drawing by Saunders-Roe Ltd.

Open sea operation.

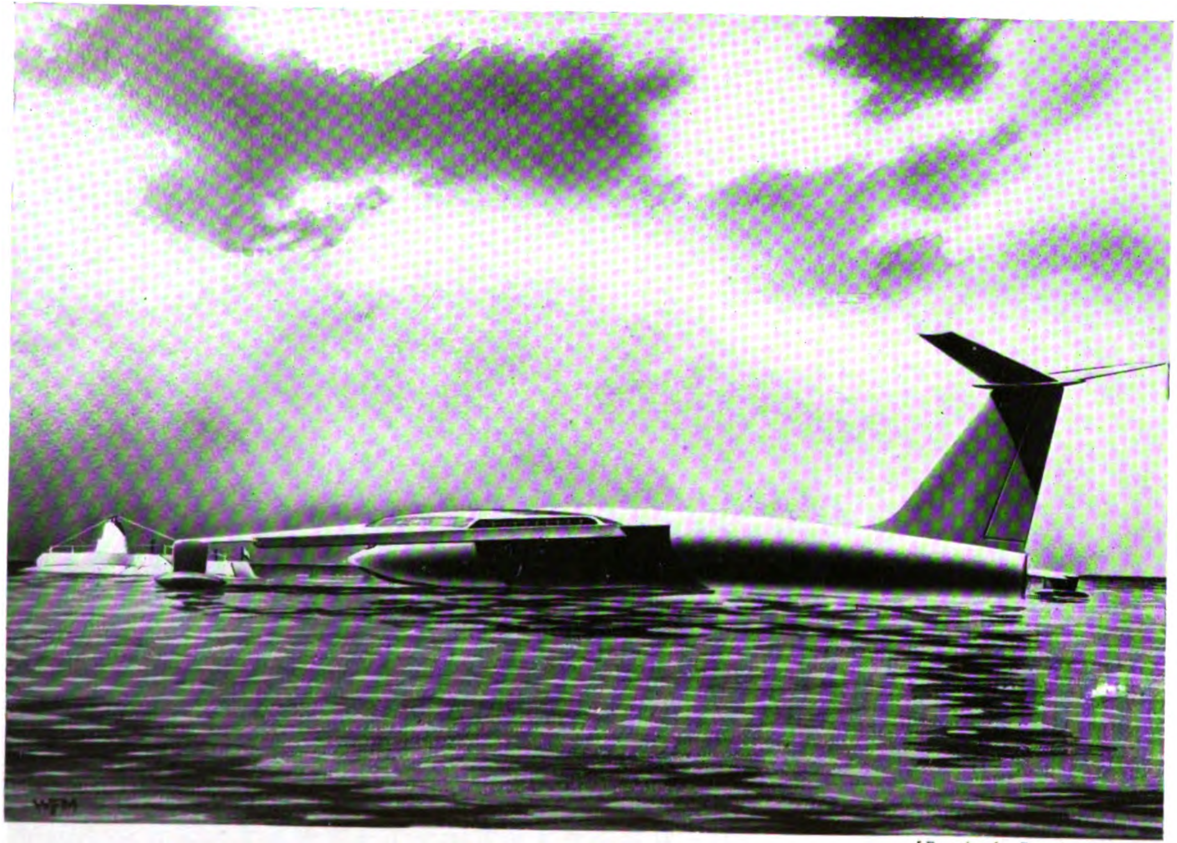
from base, mercy flights to outlying sparsely populated island territories, casualty evacuation, and minor trooping to under-developed areas. Thus, though Britain may not need a flying-boat, there is a task within the Commonwealth for the shore-based boat of medium size, capable of maid-of-all-work missions and operated from areas where the submarine threat may not be as great as that facing the United Kingdom.

Though Britain does not seem much interested in flying-boats overseas where bases are more readily available than in the United Kingdom, in contrast the Americans are actively developing flying-boats to use them from such areas. Britain's thoughts have been concerned with Europe and the Middle East and the awful threat of nuclear warfare. In the southern Dominions the threat does not exist, but our thoughts for years have been almost exclusively concerned with the one day expansion threat of the yellow races. In having foremost in our own minds our own problem, we sometimes pardonably feel that Britain in her concern with Europe has lost her traditional art of global strategic thinking, which created naval bases throughout the world in the heyday of her sea power. The bases could well today be flying-boat bases.

It is thought by some in Britain that in the post-war years Australia and New Zealand have grown apart from the Mother Country and progressively closer to America—indeed, that we are developing those unpleasant nationalist traits common in the very new nations and in some Asian peoples. There is probably some truth in this, and certainly we look more to America, for our home interest lies in her strategic sphere. In the last war our home-based forces were armed with her equipment and fought beside her in the Pacific. We have much in common and perhaps share with her a more "eager" way of life, because we are young and expanding and unhampered by tradition and precedent. But with all this our thoughts always turn to Britain for leadership, and our ties of sentiment are still as strong as ever. We come "home" to England, not to America. Individually, Australia and New Zealand have closer military ties with the United Kingdom than with each other, though this no doubt will change with the deployment of our forces to the Far East.

It seems important that the British element of the Commonwealth, that part that has sprung from the sons of Britain, should hold together and maintain the ties of common heritage, ideals and interests. The Navy was once the link, a rather frail one now. Aircraft have ousted ships as the link. There may perhaps be more involved than the cost of developing a new flying-boat, in this matter. Loss of possible leadership in the development of aircraft nuclear power is one tangible factor—a loosening of the bonds of Empire is the less apparent aspect. If Britain neglects the flying-boat, do her potential Commonwealth customers have to go to America to buy her flying-boats of the future, both military and civil? We would not go to America if there were choice in the matter. This one thing is indicative of our thoughts: of loss of leadership. Is all this wrong and is the flying-boat just a thing of the past, like the great airships we once visualised?

The flying-boat seems only required if it can do something which cannot be done by the land-plane and if the need for that thing is economically justifiable. It is debatable whether the ability to evacuate a few people from Crete or the Yangtse River, to supply small outlying Pacific islands after hurricane damage, to pick up a few people from the sea from time to time, or to support a scientific expedition in Greenland—or indeed the Antarctic Ocean—justifies the development and subsequent operating costs of a modern *large flying-boat.* These



[Drawing by Saunders-Roe Ltd.

Re-fuelling from a submarine.

missions are passive in nature and contribute little to military strategy. The United States Navy's thoughts of a mobile-based atom bomber operating from open water with a parent depot ship, are a very different kettle of fish and one to which British strategy appears to have paid scant attention. This is a surprising thing in view of the vulnerability to atomic attack of Britain's bomber bases. With widely dispersed flying-boat bombers supported by depot ships and operating from the open sea from unknown and changing positions, Britain could have the means of retaliating with nuclear weapons, whatever should have happened to her miles of concrete runways in the first few hours of global warfare.

From this two questions emerge:—

(i) Is a modern flying-boat capable of open-sea operations and thus being supported by the fleet at sea?

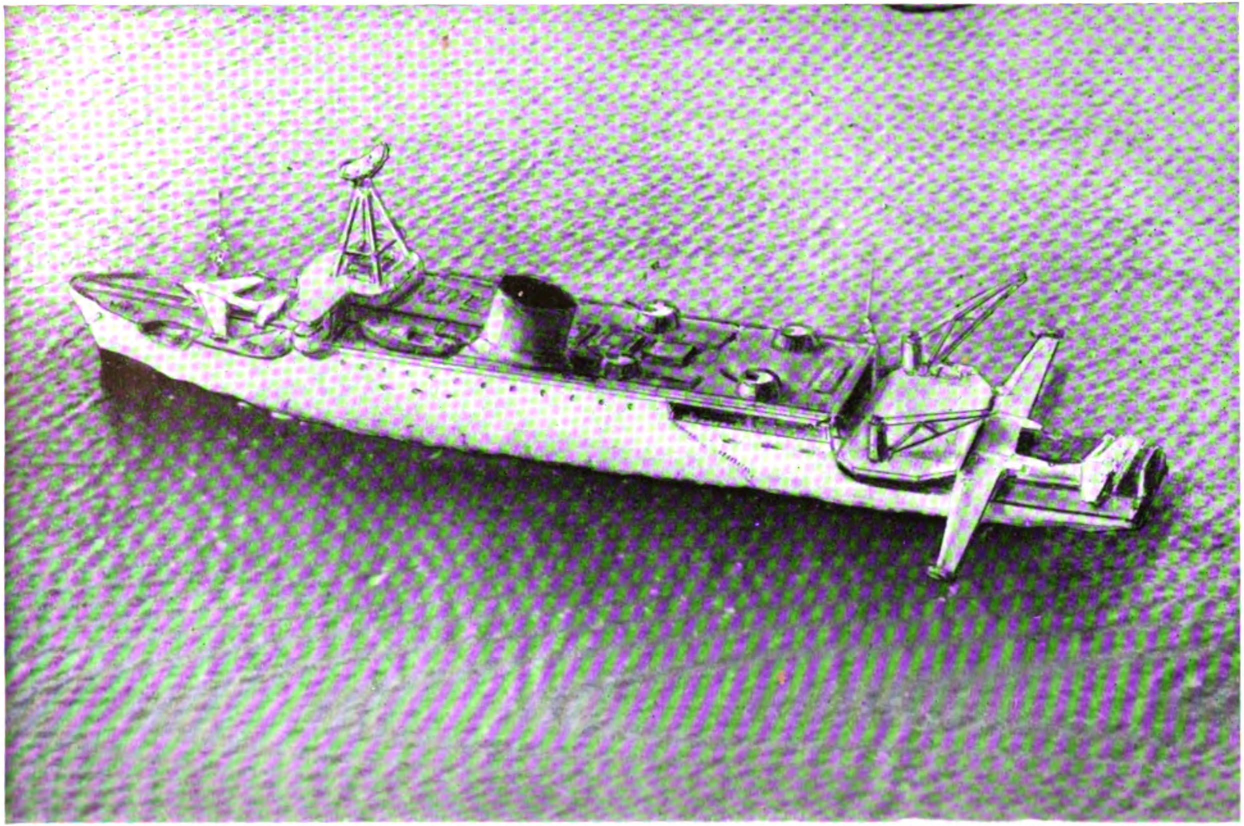
(ii) Is the Royal Air Force the right agent to operate modern military flying-boats?

If the answer to the first question is in the affirmative, then it would seem to answer the second in the negative. If modern flying-boats can operate from open water, with of course a home shore base as have ships, then the enormous potential of the fleet-supported atom-bomber flying-boat must be recognised.

Latest developments in flying-boat design have combined a reduction in hull resistance with a great improvement in cleanliness and rough-water behaviour. A reduction of some 30 per cent in spray height and impact loads has been achieved by an increase in the fore-body length-to-beam ratio and after-body length-to-forebody-length ratio, coupled with the introduction of refined variations of dead-rise throughout the hull length. Resistance to rising on to the planing bottom has been improved and the long after-body prevents the tendency to skip off when running across sea. Model tests, in both the United Kingdom and America, show that an orthodox modern maritime reconnaissance flying-boat can operate in wind waves some eight feet high superimposed on swells of very much greater height. Preliminary full-scale verification of these conclusions has been obtained in the United States on an aircraft in the Sunderland weight capacity, and further evidence is forthcoming from advanced American types coming into service. The ability of the flying-boat to operate from rough water improves with increase in size. As has been stated by a leading designer, the flying-boat will have a great advantage over the land-plane when using nuclear power, as there will be little difference between the alighting and take-off weights. To capitalize, therefore, on the ability to operate from the open sea and at the same time to develop the enormous potential of nuclear-powered aircraft, thoughts must turn to the very large flying-boat.

In the areas from which military flying-boats could be usefully operated, probably the North Atlantic produces the most difficult conditions. In this ocean, at latitude 50° for example, the sea does not exceed eight feet in height during three-quarters of the year, and twelve feet swells, which are acceptable, are even less frequent. Conditions in the Pacific and Indian Oceans are more favourable, if the technique of taking off along the swell is followed. In some conditions of strong cross-winds it will be necessary to commence the take-off into wind, turning out of wind along the swell at appropriate speeds.

Probably the greatest stumbling-block to the acceptance of the claim that modern flying-boats can operate from the open water will be the views of the old boat pilot who has thumped into swells in a Southampton or Rangoon off Muscat in the Persian Gulf, or the later Sunderland pilot who has seen a convoy "ploughing into a big seaway" and wondered how he'd get on if he had to ditch.



[By Courtesy - Short Bros. & Harland Ltd.

Depot ship with aircraft in dock.

Taking off in really rough water from the open sea sitting on top of an H bomb, is not likely to be the flying-boat pilot's idea of a boating holiday, but modern science indicates that it could be done. There are, of course, days when ships capsize and a flying-boat just couldn't operate, but the large aircraft has the ability to move its base rapidly or divert in a few hours. It should be remembered that in strong wind conditions the additional airlift provided by the wind makes the total resistance (air plus water) when taking off into wind, effectively the same as in calm water. Also, when taking off into extreme winds the water speed at take-off may only be 50 or 60 knots, and due to the modern flying-boat's relatively narrower beam the response to the seas is much better than that of the best type of fast motor torpedo-boat.

From the above it should be apparent that experience in the ways of ships and a knowledge of seamanship beyond the training of an airman are essential to operate modern flying-boats successfully from the open sea. A scant knowledge of the subject suffices to operate aircraft from sheltered water bases. To utilize the modern flying-boat's potential and operate from the open sea requires not only an aircraft designed for the purpose but a crew trained in moving on the water in all sea conditions. The Navy would seem the logical service to provide such crews.

If the Navy are best equipped to operate large flying-boats, then they must not be prevented from making the best use of the aircraft's potential by being denied the right to operate in the strategic-bomber role. There would seem no reason why the Navy should not operate flying-boats in the strategic-bomber role under the broad general control of the Air Staff, in parallel with the Royal Air Force Coastal Command's provision of maritime-reconnaissance and anti-submarine aircraft, which meet the needs of the Navy, in exercising the control of sea communications. The logical answer to such matters would seem to be a Royal Defence Force with its Air, Sea and Land arms, with a common supply service, but logical answers usually take a long time to arrive.

Given the right crews, very large modern flying-boats could operate from the open sea and be supported by surface craft designed for that purpose. This would provide a mobile-based force of strategic-bombing aircraft, ready to strike with nuclear weapons from an indestructible take-off area and supported by ships at sea, able freely to choose a base position unknown to their enemy. By the reason of its character and training the best agent to operate such a force is the Royal Navy, under the strategic direction of the Air Staff.

[Acknowledgments to Saunders-Roe Ltd. for technical information and drawings and to Short & Harland Ltd. for a drawing.]

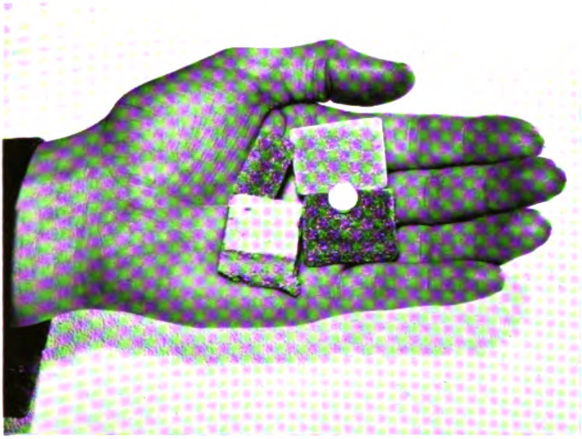
[National Defence Photo

R.C.A.F. SIKORSKI S-55s—*The first of ten Sikorski S-55s recently purchased by the Air Force is shown above landing at R.C.A.F. Station Sea Island, B.C. The new aircraft is a utility type of helicopter and will be used in search and rescue operations. Twenty-four pilots are to receive training on the new aircraft, eight of whom are currently under training with the Okanagan Helicopter Company in British Columbia.*

ROYAL CANADIAN AIR FORCE

SURVIVAL TEST — AT 33° BELOW

RECENTLY nine aircrew officers spent a sub-zero 10-day period in the Alberta bush, proving that R.C.A.F. emergency rations and equipment will keep a man alive and well.



[National Defence Photo

A MEAL FOR SURVIVAL.

Two-and-a-half jelly tablets, one-third shortbread biscuit and a vitamin tablet. In addition a cup of coffee (from powder form).

Food consisted for the most part of emergency rations, a day's meal being represented by concentrated foodstuffs that hardly cover the palm of a man's hand. Some of those undergoing the test existed with nothing but their normal flying gear, a parachute, and emergency items contained in the small seat pack which forms part of a fighter pilots' parachute harness. Temperatures ranged as low as 33 degrees below zero, and while the group lost on an average of 11 pounds each, all came through the tests in perfect physical condition. There were no accidents and no cases of frostbite.

Purpose of the exercise was to test certain types of survival equipment under winter bush conditions and to see just how representative aircrew would get along with only what they would have following a bale-out or crash-landing. Regular survival courses are given by the R.C.A.F. in the Alberta bush and in the Arctic, but the purpose of this exercise was to test equipment rather than to train the personnel involved.

Detailed reports on the nine officers who served as human guinea pigs are being studied as part of a continuing R.C.A.F. programme to improve its survival equipment. Selection of " bush experts " was avoided, and the R.C.A.F. feels that the reactions of those involved in the tests are representative of average Service aircrew.

The tests were the responsibility of the Climatic Detachment of the R.C.A.F's Central Experimental and Proving Establishment and were carried out at a small lake about 175 miles north-east of Edmonton. Three R.C.A.F. officers

[National Defence Photo

After 10 days survival test an aircrew in shelter made from parachutes and trees. Left to right, front row: **F/L Weiglund, F/O Schwanky, F/L Flander, F/O Koch. Rear row: F/O Ramage, F/L D. V. Thompson.**

supervised the tests and visited each of the "survivors" once or twice daily as a safety measure. Arrangements were made for an airlift from the lake had any emergency developed.

The nine officers who played the part of survivors were: a CF-100 pilot from R.C.A.F. Station St. Hubert, P.Q.; Flight Lieutenants R. E. Weiglund, a radio officer from R.C.A.F. Station Torbay, Newfoundland; D. V. Thompson, a navigator from R.C.A.F. Station Greenwood, N.S., and B. D. Henry, a radio officer from R.C.A.F. Station Rockliffe, Ont.; and Flying Officers W. R. Ramage, a pilot from R.C.A.F. Station, Edmonton, R. E. Schwanky, a pilot from 426 Transport Squadron, Dorval, P.Q., a CF-100 navigator from R.C.A.F. Station St. Hubert, P.Q., J. T. Koch, a Sabre pilot from R.C.A.F. Station Chatham, N.B., and L. A. Flander, a pilot from the Canadian Joint Air Training Centre, Rivers, Man.

Three other officers accompanied the party on the tests, supervising them and acting as observers. Officer in charge was Flying Officers D. J. G. Soper from the Institute of Aviation Medicine, Toronto.

Squadron Leader W. T. F. Tourgis, a pilot from Tactical Air Command Headquarters, Edmonton, and Flying Officer W. H. Stockdale, a radio officer from Air Force Headquarters, Ottawa, acted as observers.

The party was assembled in Edmonton and was flown in to R.C.A.F. Station Cold Lake, Alta., the site of the Air Force's new air weapons range. They were given medical checks and were flown in from there the same day to a small lake about 30 minutes' flying time away, aboard an Air Force Otter.

The party of three observers was established in relative comfort in a log cabin and the nine " survivors " were spotted at different points on the lake shore.

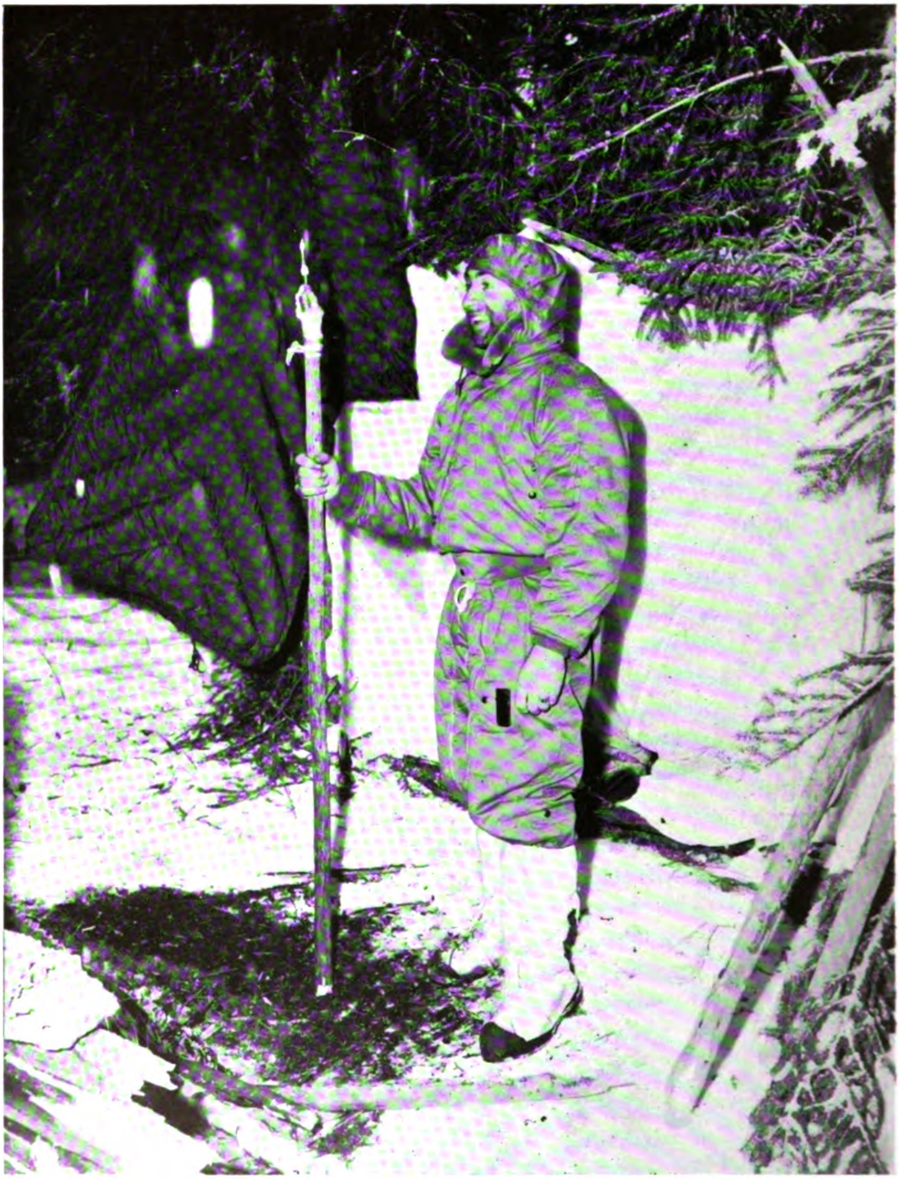
The three fighter aircrew had a much tougher time than the other six. It was assumed that they had baled out of their aircraft and they were left at widely separated points along the lakeshore, each to fend for himself.

Each was left just as he would have landed after abandoning his aircraft, wearing normal winter flying gear, with an opened parachute and a seat pack containing basic survival equipment. This included a clasp knife, short-range radio transmitter, sleeping bag, and two survival food packs. A choice of certain other survival items was permitted to bring the seat pack up to full normal capacity, but these items did not include additional food or clothes. The seat pack measures 14½ in. square and is 5 in. deep, which eliminates luxuries. Extra items of clothing not actually worn while flying were not allowed.

The party of six was presumed to have crash-landed in their aircraft, and while they were no better off in the way of foodstuffs, they camped in a group and were provided with many more items of survival equipment.

A small amount of game and fish was obtained by some of the " survivors " but in the main the food packs provided what the group ate during the tests. One of the fighter aircrew lived entirely on his emergency rations. Another of the fighter officers managed to catch a squirrel and three small birds, and brought half of his emergency rations out of the bush with him, unopened.

Each food pack weighs 2 lb. and contains slightly more than 2,500 calories. This provided each man with a little more than 5,000 calories for the 10-day period. The food packs contain jelly candy, shortbread, vitamin tablets, coffee mix in powder form—and an instruction sheet. This sheet describes a daily ration as being 2 packages of jelly candy, 1 package of shortbread, 1 package of coffee, and 3 vitamin tablets. Placed on the palm of a hand, a " meal," representing one-third of a day's rations, leaves a lot of space showing, as one



[National Defence Photo

The Sabre pilot with his home-made chisel for piercing the ice (to fish), made by lashing his clasp knife to a pole.

of the officers put it.

While the emergency rations are not sufficient on their own to maintain a man over a lengthy period, they are carefully devised to produce the maximum in caloric content and other desired values. Their content is result of research by the R.C.A.F. and the Defence Research Board.

Another vital item tested was the seat-pack sleeping-bag. Down filled and vacuum packed in a glass-fibre container to enable it to fit into the small seat pack, it weighs slightly more than 6 lb. Deliberately made short to conserve space and weight, and to discourage the survivor from pulling his head into it with possibility of his breath freezing, it drew criticism from the nine " survivors " during the early part of the tests. By the end of the period, however, they reported that they were generally sleeping warmly in it.

Inspection visits were made twice daily by the observer team to each of the fighter aircrew, a daily check only being made of the group of six. An aircraft from Cold Lake flew over the lake each morning, ready to land and evacuate a possible victim of emergency.

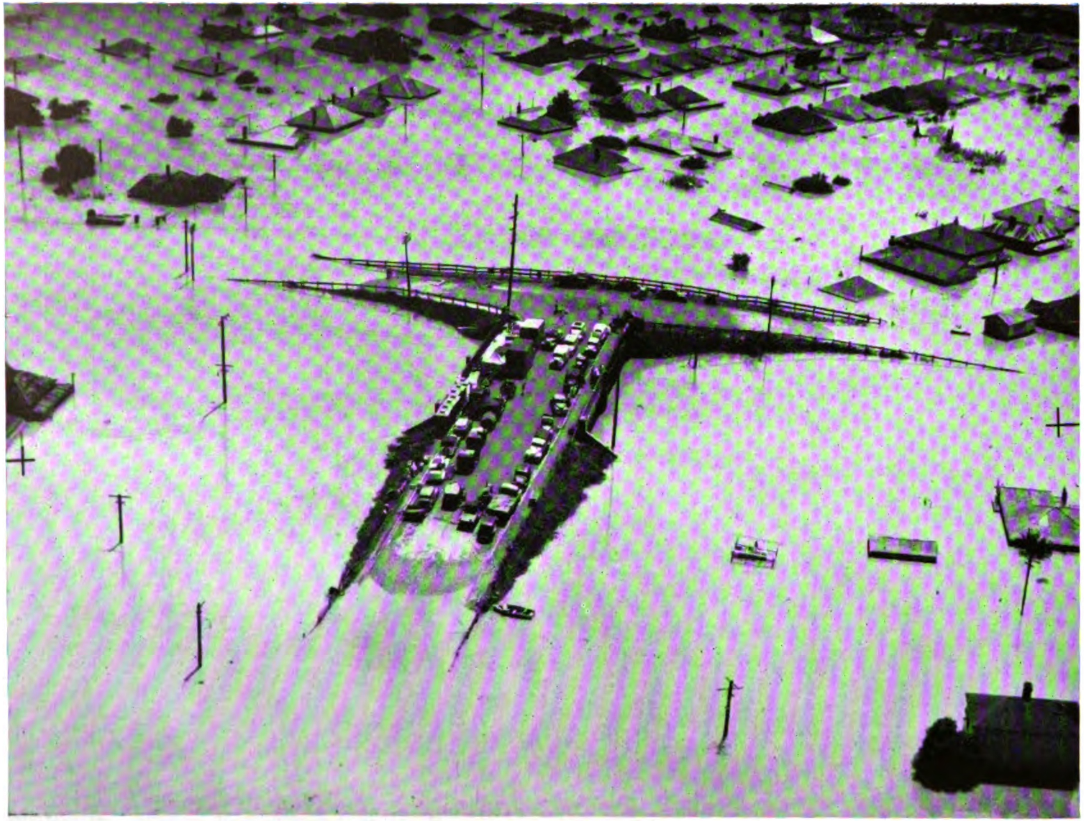
Reactions of the individuals varied. A.F.H.Q. officials, however, while still in the preliminary stages of assessing the exercise, feel that already the project has established some points. First is that the survival rations, while necessarily small in quantity, will keep a survivor alive in the bush during winter for a reasonable period if properly used.

Another point established is that aircrew learn quickly, even without previous experience, to get maximum value out of the limited survival equipment available to them. Some of the group suffered needless discomfort during the initial stages of the exercise, but by the end of their bush stay were subsisting more comfortably as a result of having learned to get the most from their equipment.

Several instances of ingenuity appeared. One officer found that his coffee, boiled in the metal food-pack container, had an unpleasant taste from the metal. Calling upon school-day chemistry lessons he rectified that by addition of charcoal. Another officer fashioned a fish hook from a metal eyelet of his seat pack, made a line from his parachute shrouds and used a bit of red flannel, taken from the label on his seat pack, as bait. He actually caught a large fish with it, only to have it bite through the line and disappear as he was hoisting it from the hole he had cut in the ice. The hole had been chopped with an ice chisel fashioned from his clasp knife lashed to a pole.

While the purpose of the project was to test equipment rather than individuals, all came through the ordeal in perfect mental and physical condition, and their reactions to the emergency equipment used are being studied. A flyer baling out of his aircraft in the dead of winter over desolate bush country cannot take much with him. Limited space and other factors force a compromise in the amount and type of items that can be included. Winter-flying gear and other clothing, for example, must be acceptable for flying, in addition to possessing maximum possible survival qualities.

What the flyer does take when he bales out or crash-lands may well mean the difference between life and death. Development and selection of items to go into emergency packs is a complex task, for space and weight are limiting factors, and items cannot interfere with the operational capability of the aircraft or of its crew. The recent exercise—which might have been dubbed Exercise " Deepfreeze "—was part of the continuing search that the R.C.A.F. is carrying on for the perfect answer, to attain maximum possible survival chances for its aircrew.



[R.A.A.F. Official Photo

Marooned by flood, car occupants and those from surrounding homes were fed from Dakotas, until rescued by surface craft.

ROYAL AUSTRALIAN AIR FORCE

THE GREAT AUSTRALIAN FLOOD

By Squadron Leader H. R. Rayner, R.A.A.F.

FLOODS which ripped through the Hunter Valley and central west of New South Wales in February, while setting records in destruction also saw the biggest flood air-rescue organization in Australian history—made up of over forty R.A.A.F. aircraft of all types and five R.A.N. helicopters—spearheading the task of rescue and food distribution during the first chaotic days of the deluge.

Over 200 tons of supplies were dropped from the air in the first four days of the flood, while helicopters made 80 rescue flights. This total of supplies had climbed to nearly 500 tons by the end of a fortnight, and the "choppers," as rescue needs tapered off, did invaluable work in food and passenger delivery.

On Black Thursday (24th February) the Police Rescue Intelligence Centre at Sydney, which co-ordinates flood rescue work, made contact with the R.A.A.F's Home Command Operations section asking for aid.

Even before the nation was fully aware of the tragedy developing, R.A.A.F. reconnaissance planes had been ordered out. The Staff Officer Operations at Home Command, Group Captain D. W. Colquhoun, D.F.C., A.F.C., had sent instructions to Amberley, Canberra and Williamtown, and the same night Lincolns and Dakotas were being loaded with rescue gear and emergency food supplies for dawn flights over the flood areas the following morning.

Williamtown (situated so close to the disasters at Maitland and Singleton) was the core of the first direct major air relief operations. Here the Commandant of the School of Land / Air Warfare, Group Capt. R. H. Davis, O.B.E., along with his base squadron C.O., Wing Commander J. Handbury, A.F.C., and the C.O. from the Rathmines unit, Wing Commander W. L. Brill D.S.O., D.F.C., took over the control of the flood-operations room and they worked shifts right throughout the floods.

Before the day was out it was clear that a base would also have to be set up closer to the western floods, and three Dakotas and a R.A.N. helicopter were sent to Dubbo as the core of an air-relief detachment in the Warren-Gilgandra-Bourke area. It was to be an all-services affair here! Lieutenant-Commander D. F. Farquharson was the Navy's "chopper" pilot. Squadron Leader T. Bourke, M.V.O., A.F.C., was to find the control of three Dakotas on Dubbo aerodrome (for days isolated from Dubbo township itself by flood waters) quite a different problem to controlling the half-dozen aircraft of the Queen's Flight last year. In addition to airmen from the Dubbo R.A.A.F. Stores Depot, a team of Army despatchers from the Air Portability Wing at Williamtown assisted in the loading and despatch of relief from Dubbo. Liaison officer with

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Waiting to drop food to those marooned by flood near Maitland. Nearly 500 tons of supplies were dropped by Dakotas in the flood areas.

police and civil authorities and operating from the Dubbo Showground in the early stages was Flight Lieutenant D. Brennan of Canberra.

At dawn on Friday Lincolns from Amberley and Dakotas from three R.A.A.F. aerodromes were criss-crossing the flooded State, dropping succour where immediate needs were apparent, and the R.A.N. helicopter (which was to be lost tragically later in the day) was on its way to Williamtown despite reports of bad weather which had been sent out from Mascot.

Friday was to be the most strenuous and most bitter day of the flood, with its high toll of civilian casualties and the attendant endless pleas for aerial aid. Lieutenant G. McPhee was the pilot of the R.A.N. Sycamore which crashed into the torrent after a vain rescue bid over a railway signal box at Maitland, but he was back on the job when a second " chopper " was ferried up from Nowra. Nine thousand sandbags were flown to Dubbo from Richmond and an additional 4,200 from Williamtown. (These were the first of something like 150,000 dropped to flood towns in a few days.)

Water-purifying chemicals, life-jackets, rubber dinghies, were dropped from the air. Torches and baby napkins, water tins and shovels—the list of items was never ending.

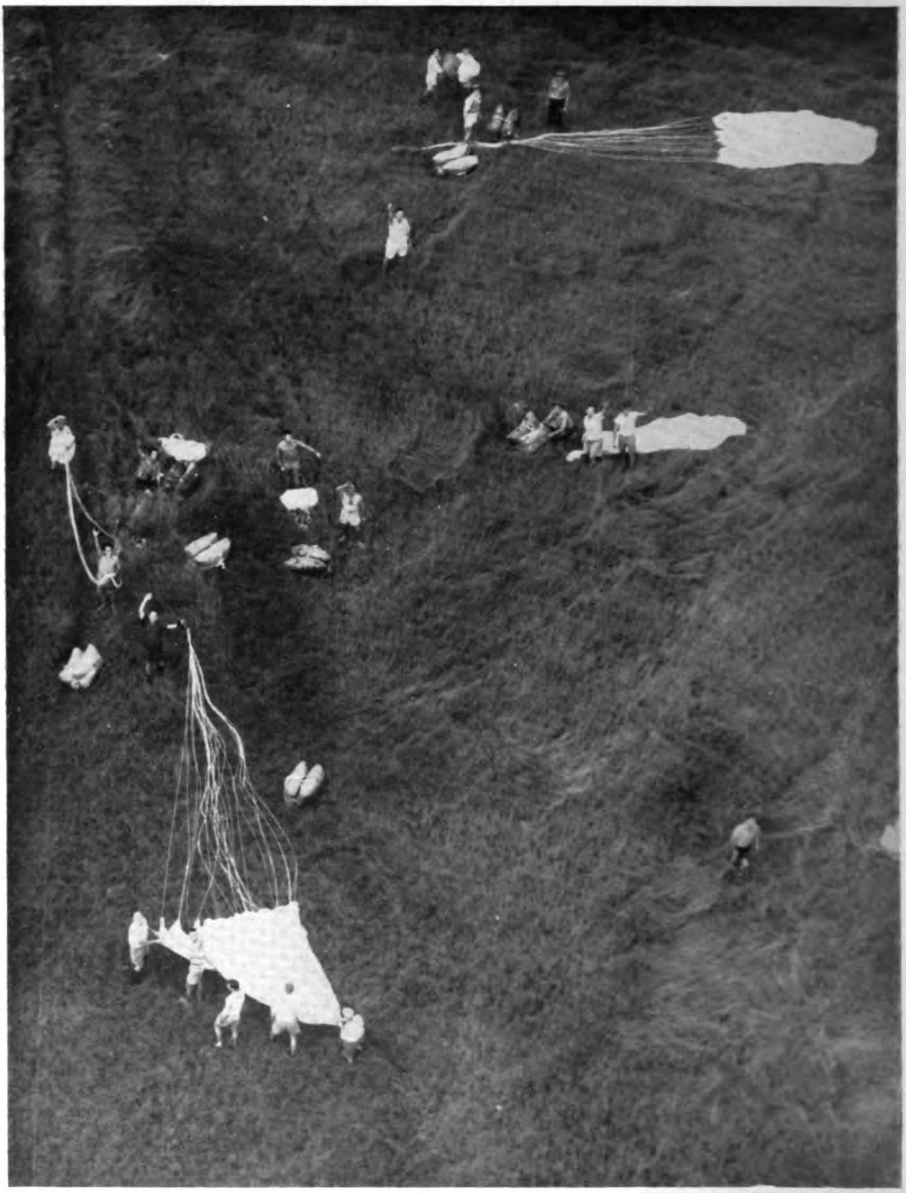
Biggest single contributor to the strong Dakota component was No. 86 Transport Wing at Canberra, and one of the pilots was the wing leader, Wing Commander N. Lampe, O.B.E., for on occasions it had eight Daks spread over the State at one time; East Sale produced another three, Laverton two, Williamtown one, while the Department of Civil Aviation and the Navy put one each into the flight. R.A.A.F. Anson, Wirraways, Mustangs, Vampires and R.A.N. Fireflies were also rounded up in this flood " fleet."

Coupled with the light aircraft periodically to be used later by civil volunteers, the aircraft taking part in Operations " Flood Relief " amounted to over 60.

By Saturday the helicopter force was beginning to assemble. Other R.A.N. 'copter pilots ferrying their craft to the flood centres were Lieutenant J. I. Ferguson, Lieutenant N. D. McMillan and Lieutenant J. A. O'Farrell. Mechanics were working feverishly on the R.A.A.F's only Sikorsky (based on Richmond) and this was ready the same night. Two of these were from the carrier H.M.A.S. *Sydney* (which was on its way to Perth) and they were ferried back via Laverton.

Every plane out of Williamtown was loaded with part of the 12,000 cartons of food which were dropped wherever the need was seen in the Scone-Singleton-Maitland area. In the afternoon the Mayor of Warren appealed to Police Rescue for as many sandbags as possible; he said the situation was desperate Superintendent McAuley asked if a drop could be made at Warren, and at 10.30 that night Sergeant J. Guggenheimer delivered 9,000 bags (the first of five similar loads) right on target. Guggenheimer's comment on return to Richmond at midnight tells the story: " We were over a spot a few hundred feet square near the railway station. The town lighting still worked. Cars with their headlights on surrounded the dropping zone. The crew, with the help of two reservists from Richmond, kicked out the bags. I'm not certain whether they got them O.K." (Warren got the bags O.K. that night, plus another 6,000 dropped from Sergeant Collins's plane the following morning.) Guggenheimer took another load to Warren and on return Collins flew to Walgett with a load of 500 blankets, 200 lb. of yeast and some food. Sandbags failed in the bid to save Warren but they materially assisted in maintaining the levees built around Nyngan, which was three parts surrounded by water.

Rampaging flood waters made another detachment necessary, and on Flood



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Flood victims wave thanks to aircrew on completion of drop of food in Denman flood area.

Day plus three (Monday, 28th) this was in operation at Tamworth, which brought air aid closer to the Narrabri-Gunnedah-Walgett area. Two navy "choppers" moved from Williamtown, and the R.A.A.F. Sikorsky flew up from Richmond with Squadron Leader D. Beattie (who is also C.O. of the City of Sydney Squadron) and Flight Lieutenant R. McKimm. They were later to be joined by Wing Commander K. Robertson, from Home Command, who is also a "chopper" pilot, with Flight Lieutenant J. W. Price, R.A.F., from Williamtown to act as liaison officer. Later the detachment moved to Narrabri, with Wing Commander K. Robertson, A.F.C., in charge and left Flight Lieutenant Price at Tamworth.

In the hurly-burly of the mass of rescue work it is amazing that somebody found enough time to keep a check on loads, but nevertheless they did. In the first four days of flood-relief work air freight (not including passengers and storpedoes) was up to 200 tons. From Williamtown alone Daks flew 50 sorties, Lincolns 12, helicopters 48 and the Anson 8, and from them was dropped 137,000 lb., in addition to 36 storpedoes, 35 crates of bread and some passengers. Tamworth (virtually only a shuttle centre) contributed an additional 20,000 lb. of supplies, while there were 16 helicopter rescue sorties at Maitland and eight at Narrabri.

At Dubbo there were 40 Dakota sorties to drap 81,000 lb. of food and rescue gear, plus 21,000 sandbags, while Lieutenant Commander Farquharson flew 36 rescue sorties.

From Richmond 18 Dakota sorties added 60,900 lb. to the growing weight of relief goods.

Thursday, 2nd March, was one of the heaviest individual day's air-lifts recorded: Dubbo 55,000 lb.; Williamtown 55,700 lb.; Richmond 33,000 lb.; and Tamworth added locally a further 2,000 lb. for dropping.

During the fortnight of air flood relief, Service aircraft flew 1,152 hours in 468 sorties. Some of the more interesting totals of supplies dropped were: blankets 4,452; tents 73; mattresses 803; loaves of bread 6,730; bales of hay 4,702; medical supplies 11,935 lb.; disinfectant 2,979 gallons; mail 6,500 lb.

In this summary of air work it's not out of place to remember that the ground force of the R.A.A.F. played a staunch part in flood relief. At the first warning of the Hunter Valley danger a party of 220 ground staff from Williamtown, with 12 trucks and a mobile cooker, went to the Maitland area and became the core of rescue and flood re-organisation in the district. They were led by Squadron Leader D. Murphy and Squadron Leader H. Harman. With them throughout their flood work was an R.A.A.F. chaplain from Williamtown, Flight Lieutenant J. W. T. Henderson, who when the Maitland flood was at its height dived into raging waters and rescued a man.

At Williamtown over 400 flood refugees and stranded motorists were housed and fed in the paratroop hangar, and their appreciation was voiced to Flight Lieutenant D. Kuschert and Warrant Officers Holland and Robertson and the Air Force and Army men who helped them, in three hearty cheers. Grader operators from the Airfield Construction Squadron took their machines to the Newcastle—Williamtown road and hauled "highloaders" of supplies when ordinary transports could not get through the flood waters.

At Dubbo, on a smaller scale, the same thing happened. The Stores Depot C.O., Squadron Leader A. F. Carrey and his Adjutant, Flight Lieutenant J. Garvin, set organization moving to house over 50 refugees at the depot, while its stocks of tents, tarpaulins and equipment were denuded. The unit medical orderly and some air-force wives cared for ten invalid women who were moved to the unit sick quarters. Most of the unit members were on truck rescue duty in the floods too.

But for every instance of heroism or humanity recorded in the daily Press there were innumerable instances unrecorded and sometimes almost unseen.

Some specialized lessons were chalked up, too. Navy helicopters use 100-octane fuel, which is not readily available inland, and stocks had to be ferried for them by Dakotas. The R.A.A.F. helicopter is able to use fuel " milked " from Dakotas operating on 91-octane in the area if their own stocks of fuel become short.

In flood-time flying unusual hazards also present themselves. Birds robbed of normal nesting areas tend to concentrate in aerial flocks, and one Dakota which crashed into a big flock was damaged about the nose and mainplane. Pilots quite familiar with their terrain must not forget that at night power supplies can be off at one town and on at another.

Aerial freight must be staunchly bound. A thirty-pound mattress draped around the tailplane of a Dakota piloted by Flying Officer A. Proudfoot was the result when a load of mattresses burst as the load was thrust out into the air. Fortunately for the crew, the slipstream finally disintegrated the mattress.

Pilot fatigue was not so apparent in the transport field, where relief was usually available, but among the helicopter pilots long hours of tense concentration told their own story.

For the Armed Services much of the flood relief work could be regarded as training; the sheer danger of some of it improved the training value and it is obvious that many relatively minor points will be incorporated in rescue techniques.

There are, however, lessons to be learned by the civil community; some of them are outside the field of air relief, some the reverse. If towns-people return to the flooded areas, and Australian history shows that they will, then they will have to shoulder some burdens of preparedness and organization.

Dropping zones and emergency landing strips must be ready, protected and known at all times; civil authorities must accept responsibility for the marshalling and nominating of evacuees if air evacuation becomes necessary; and supply parachutes must be returned to police as soon as possible for return to base.

Flood prevention and flood mitigation will exercise civil and political planners for decades to come, but it is certain that it will be the sky towards which flood victims will look for first relief when rivers again take control.

ROYAL NEW ZEALAND AIR FORCE

NEW ZEALAND FORCES TO MOVE TO MALAYA

By Flight Lieutenant G. Bentley, R.N.Z.A.F.

THE New Zealand Government has decided that the Royal New Zealand Air Force will contribute units to the Far Eastern Air Force in Malaya. No. 14 (Fighter) Squadron is being moved from Cyprus, where it has been stationed for almost three years, to Tengah, in Singapore, and No. 41 (Transport) Squadron is being transferred from its Auckland base to R.A.F. Station, Changi, also on Singapore Island. In addition, units of No. 5 (Maritime) Squadron are to leave Lauthala Bay (Fiji) for periodic exercises in the Malayan area. Besides the Air Force contributions, New Zealand is to supply a Special Air Service unit and provide two Royal New Zealand Navy frigates for service in Malayan waters.

These commitments are all subject to review at the end of two years.

No. 14 Squadron will continue to be commanded by Squadron Leader N. H. Bright, and No. 41 Squadron by Squadron Leader R. A. Manners, M.B.E. The fighter squadron will be re-equipped in Malaya with Vampires but these will be replaced within six months by Venoms. No. 41 Squadron will operate with its present Bristol freighters. Best-known fighter squadron of the R.N.Z.A.F. in the Second World War, No. 14 was the first to be formed although No. 15 Squadron was actually the first to go into combat overseas. No. 14 Squadron served in the Pacific War with distinction and afterwards represented New Zealand in the Occupation Forces in Japan. It was the first New Zealand fighter squadron to equip with jet aircraft.

This will be the second time No. 41 Squadron has served in Malaya. A flight was attached to F.E.A.F. from 1949 to 1951, flying Dakotas alongside units of the R.A.F. and R.A.A.F. on supply-dropping, communications and other vital work in the Malayan anti-bandit campaign. This detachment first flew from Changi with the R.A.F. and later joined forces with No. 38 Squadron, R.A.A.F., at Kuala Lumpur. The flight carried out 260 communications sorties and carried more than 4,000 passengers inside and outside Malaya. It took its turn at dropping supplies to army and police patrols operating in the Malayan jungle. In 211 aircraft sorties, more than 625,000 lb. of supplies were dropped, without accident.

AIRMAN BECOMES NEW ZEALAND RIFLE CHAMPION

For the first time in more than 50 years, a serving member of the Armed Forces has won the New Zealand National Rifle Championship.

He is Flight Sergeant D. J. Caughley, R.N.Z.A.F. (Woodbourne) whose aggregate score was five points ahead of W. N. Masefield (Blenheim), long renowned as one of New Zealand's finest riflemen.

Two other members of the R.N.Z.A.F. also qualified for the Queen's Fifty. They were Corporal R. M. Cunningham and Leading Aircraftman H. V. Childe, both of R.N.Z.A.F. Station, Woodbourne.

ACQUAINTANCE RENEWED

When the Inspectorate of Radio Services in the Royal Air Force visited New Zealand late in March, an old acquaintance was revived between Group Captain C. C. Morton, C.B.E. (the I.R.S.), and Air Vice-Marshal W. H. Merton, C.B., O.B.E. (Chief of Air Staff, R.N.Z.A.F.), who were together at the Air Ministry a few years ago. Group Captain Morton was visiting New Zealand to inspect R.N.Z.A.F. radio services and to offer advice on any measures necessary to promote common standards of radio services in the Commonwealth air forces.

[Photo by "The Dominion"

From left: Group Captain T. F. Gill, D.S.O., Deputy Chief of the Air Staff, R.N.Z.A.F., Air Vice-Marshal W. H. Merton, C.B., O.B.E., R.A.F., Chief of the Air Staff, R.N.Z.A.F., Group Captain C. C. Morton, C.B.E., R.A.F., and Wing Commander F. McIlwaine, Director of Signals, R.N.Z.A.F.

THE AIR FORCES IN PARLIAMENT

(This article was completed on 12th May, 1955)

THE SECRETARY OF STATE'S MEMORANDUM

AS the previous article in this series went to press before this year's Air Estimates were debated in Parliament, it was not possible to deal with them at the time; but the *Statement on Defence*, 1955, which set out the Government's general defence policy, was as fully treated in that article as space permitted.

In his Memorandum to Accompany the Air Estimates, 1955-56, the Secretary of State said: "The net total of Air Estimates for 1955-56 is £513,900,000, compared with £491,640,000 for 1954-55." These figures represent the net cost to the United Kingdom. The Air Ministry's share of American aid this year is £26,500,000, whereas last year it was £45,360,000. So the real comparison is between the gross total expenditure on the Air Services of £540,400,000 for 1955-56 and £537,000,000 for 1954-55.

The difference in totals is small, but differences in the make-up of the figures are significant, as this year's Estimates allow for £32,000,000 more to be spent on fighting equipment (aircraft and armament) than was provided in the previous year, and greater provision has been made this year for radio and radar equipment. Corresponding reductions in expenditure on petrol and oil (mainly due to reduced prices) and on clothing are estimated, as well as on other items.

Though the average personnel strength of the Royal Air Force will be slightly smaller this year, more money will be needed on account of pay increases and additional national insurance contributions; and these, together with the extra pay of civilian employees, almost exactly take up the difference of £3,400,000 in the gross totals for this year and last.

THE R.A.F. AND ITS EQUIPMENT

The primary task of the R.A.F. is to build up its "V" bomber force (with its nuclear potential) in order to provide, with the American Strategic Air Force, the main deterrent to aggression. If, however, this deterrent fails, our bomber force, with those of our allies, must "make counter-action in war decisive in the shortest time" and must "contribute powerfully to the defence of this country against attack by air and sea and to the support of the Allied front in Europe."

This merely repeats, in different words, what was said in the earlier *Statement on Defence;* but, even so, it is like Antonio's means, mainly "in supposition." For, as the Memorandum goes on to say, "the next twelve months will see the 'V' bombers *beginning to come into service.*" (The italics are ours.) "Meanwhile," it continues, "our Canberra force is at its full strength, equipped with an aircraft of outstanding achievement." But, as Mr. Arthur Henderson, a former Secretary of State for Air, said in the House of Commons on 17th March, "the Canberra, as an interdictor machine, is not part of the strategic air force" and "until we get the 'V' bombers, we must realize that the strategic air force is a matter for the future."

For direct defence, Fighter Command's expansion has been completed, but the proportion of all-weather fighters is to be increased. The first Javelins are expected to reach their squadrons during this year; other all-weather squadrons are to have Venom night fighters; and some Hunter squadrons have already been formed. High priority is being given to the Control and Reporting System, which is already very efficient and will become more so. The development of air-launched and ground-launched guided weapons progresses and numbers of the former have been ordered.

The flying squadrons of the Royal Auxiliary Air Force are being reorganized to meet the new conditions. Each auxiliary squadron is to be linked with a regular fighter squadron; and auxiliary squadron pilots, who have the necessary experience and aptitude, are to be trained on the high-performance aircraft with which the associated regular squadron is equipped. Thus an immediate reserve of qualified individual pilots will be built up behind their regular squadrons, for defence against a high-altitude nuclear threat. In addition, auxiliary squadrons will probably keep all their Meteors and Vampires for use as fighting units in defence against other forms of serious air attack. Second T.A.F. is to have more Canberras for photographic reconnaissance work and as night interdictors; while Coastal Command will be strengthened with special flights of Seamews for short-range anti-submarine reconnaissance.

Transport Command, which has rendered invaluable help to fighter and bomber squadrons in carrying out rapid reinforcement exercises overseas, is to have a number of Vickers 1000 long-range jet transport aircraft to provide increased mobility for the strategic reserves of both our land and air forces. In order to give aircrews of Transport Command early experience in operating high-speed jet transport aircraft before the delivery of the Vickers 1000 (which may not be ready for some time), Transport Command is to be supplied, in the meantime, with Comet II's, modified and strengthened for use as military transports. It is expected that their first job will be on the military transport service to Woomera, which is becoming increasingly important. And during this year, the first Beverleys should be reaching transport squadrons for use in the heavy freighting role, for tactical airborne operations and for supply dropping.

Much controversy has been raging lately, and will continue to rage, about the use of flying-boats for military purposes. Dr. Reginald Bennett (M.P. for Gosport and Fareham) put up a strong plea on their behalf in the House of Commons on 17th March. "I am quite convinced," he said, "that flying-boats of a modern type must be developed." The Americans had been making immense strides. Instead of short, flat, squat craft such as we were accustomed to, they were making them long and narrow. Their Martin Seafarer was now about to fly at the speed of our "V" bombers.

He also said, but without giving reasons, that the application of nuclear power to aircraft would necessitate the abandonment of runways on land in favour of water surfaces. His "crowning strategic point" was that "a large flying-boat nuclear powered is, to a very large extent, its own base. It can hide in creeks and operate from the most remote places . . . and be the elusive dispersed bomber force which seems to be envisaged in operations from the sea." The Under-Secretary of State made no reply to Dr. Bennett's suggestion, probably because it was covered by a statement in the Secretary of State's Memorandum: "The Government have decided, after much consideration and taking all things into account, that it would not be justifiable to undertake the development of a new flying-boat for military purposes." A few Sunderlands will, however, continue in service for some time.

Helicopters, on the other hand, are rapidly becoming more popular in all three Services. "Experiments in the use of helicopters in high mountains have proved successful," and one is being used now in Kenya for casualty evacuation. In Malaya, where most of our helicopters have had to be sent for obvious reasons, they are being used mainly for carrying troops and supplies as well as for evacuating casualties. But extra deliveries of helicopters are expected during the year; and when they come, a new joint Army/Air Helicopter Evaluation Unit will be formed. Anti-submarine trials and other experimental work with helicopters will continue, and there will be more helicopters available for air/sea rescue.

PERSONNEL

There has been a welcome increase in the numbers of airmen serving on engagements of twelve years or more—about 40,000, compared with 35,000 a year ago. Aircraft apprentices, for training at Halton and Locking, are coming in satisfactorily; and the intake of boy entrants has recently been limited only by the capacity of their training establishment at Cosford, so a second boy-entrant school is to be opened at St. Athan as soon as possible. We understand, however, though the Secretary of State did not mention it in his Memorandum, that the R.A.F. College, Cranwell, is far from full. Doubtless this shortage will be rectified when the Cranwell Cadet Scholarship Scheme has had time to produce results.

Lack of skilled men to fill vacancies in the highly skilled trades still presents a problem. In order to fill establishments in the Aircraft Engineering trade group, advanced training has had to be given to airmen serving on short engagements; and the same policy has been applied in the Armament and Instrument trade groups. This policy is expensive and it imposes a heavy task on Technical Training Command. Happily, larger numbers of tradesmen in these groups are signing on for twelve years or more, but it will be many years before any substantial relief can be expected. The most difficult training problem is that of the Radio Engineering trade group, the increasing importance of which cannot be exaggerated.

DEBATES ON THE AIR ESTIMATES

During the debates on the Air Estimates in the House of Commons many interesting points were raised, but only a few can be noted here owing to space restrictions. Mr. Arthur Henderson (M.P. for Rowley Regis and Tipton), in dealing with the "V" bombers, asked "whether, in view of the fact that we are so rapidly approaching the next phase of air development, namely the supersonic phase, we are developing a supersonic bomber." The Under-Secretary of State, Mr. Ward, assured him that the Air Ministry were "fully alive to the importance of developing a supersonic bomber at the earliest possible moment."

The same member also expressed concern about the possible danger, to the public as well as to Service men and women, of the accidental explosion of thermo-nuclear bombs when stored under R.A.F. arrangements and of the unintentional release of radio-active substances from them. He asked for an assurance that the bombs would be stored in such a way as to prevent their being "in any way damaging to public health and welfare." Mr. Ward replied by repeating a statement in the Memorandum to the effect that atomic bombs are stored and transported in a partly dismantled state and there is absolutely no risk of an accidental atomic explosion at any stage.

Mr. Arthur Henderson, to whom other members of the House properly refer as "the right hon. and learned Gentleman (or Member)," might now, it appears, qualify for the additional appellation of "gallant"; for he stood forth as a champion of the women of the W.R.A.F. in the matter of equal pay for equal work, which (he reminded the House) had now been accepted by the Government for its civilian employees. He said, "many women are serving in highly skilled trades, but they receive only three-quarters of what their male opposite numbers receive." He had seen, at an R.A.F. station in Germany during the days of the Berlin Airlift, a woman Corporal Fitter (Eng.) who, he said, was as efficient as any of the male fitters working in the same hangar; and he told the story of an R.A.F. sergeant who, on being asked by a Minister what he thought of the three women tradesmen working under his control, replied that he did not think too much of them because they worked too damned hard.

The Under-Secretary said, in reply, that the principle of equal pay for equal work in the Civil Service applied only to non-industrial staff—e.g., clerks; but even if it were suggested that male and female clerks in the Services should be paid at equal rates, the fact remained that Service men might, in the last resort, have to handle arms whatever their trade.

EDUCATION OF SERVICE CHILDREN

Air Commodore A. V. Harvey (M.P. for Macclesfield) again referred to the difficulties of educating the children of Service personnel, adding that from letters he had received there appeared to be even more hardship than he had at first estimated. One officer of medium rank, who was trying to give his son a reasonably good education, had found it necessary to retire from the Service, commute his pension and seek another (and presumably more remunerative) job. "Officers of all ranks and senior N.C.O's," the Air Commodore said, "run into debt and have been doing so for many years," owing to the unavoidable expenses involved in frequent postings, changes of homes, and the education of their children. "The Government," he said, "must appreciate the necessity for providing education allowances for personnel in the Services," who, by the conditions in which they serve, are practically debarred from the benefits of the 1944 Education Act. "If it is good enough for the members of one Service, say the Foreign Service, to receive allowances amounting to £120 a year *free of tax*," he concluded, "I fail to see why allowances should not be given to those in the Fighting Forces, who have many more moves than those in the Foreign Service."

To our knowledge, the difficulty of giving Service children an education comparable with that normally received by the children of civilians of equal status has existed for many years; and it is steadily increasing as the fees of good schools are still being raised. Yet no suggestion of relief has been made by any Government so far. It has been said that to grant to Service men an education or disturbance allowance would be tantamount to creating a privileged class; but the fact that Foreign Office officials already receive such an allowance defeats that argument. Only by repeating this grievance continually in the right quarters, and by pressing for official recognition, will any redress be obtained. Unless something is done pretty soon, the Services will lose many excellent officers and non-commissioned officers whom they can ill spare. The days are long gone by when an officer could be expected to have private means; and an N.C.O. has little to spare out of his family budget to pay for special schooling for his children who have been set back by frequent moves. We hope the Government will give this matter their attention in the near future.

R.F.P.

ROYAL AIR FORCE EMBLEMS

By Air Vice-Marshal W. M. Yool, C.B., C.B.E.

MANY things have become so much part of the accepted tradition of the Royal Air Force that it is sometimes difficult to visualize that far from being generally accepted, originally there were often acute differences of opinion regarding the various emblems, continuing in some instances for years. The aircraft roundel, for example, originally introduced during the First World War, was still under discussion as late as 1947.

With the passing of the years the origins of these emblems may be forgotten, and it may therefore be of interest to record the history of some of those emblems which were designed for the Royal Air Force or adopted in its early days. When the Royal Air Force was formed on 1st April, 1918, only the motto and the roundel were in existence. As the motto is the oldest an ante-dated the formation of the Air Force itself by over five years, it will be dealt with first.

Many well-known names are connected with the selection of *Per Ardua ad Astra*, and it originated in the first instance in 1912, from Brigadier-General Henderson, then Chairman of the Royal Flying Corps Committee, the body which, under the Army Council, was in general charge of the newly formed Flying Corps. Others whose views were invoked included Sir John French, the Chief of the Imperial General Staff, Captain E. L. Ellington, then a junior staff officer, and the Right Honourable J. E. B. Seely, the Secretary of State for War, before the motto was approved by H.M. King George V on 17th March, 1913.

Although the original motto met with fairly general approval there were some differences of opinion as to its suitability amongst the Latin scholars on the Army Council, particularly as they were by no means agreed as to the meaning of *ardua*. Suggested translations included "difficulties" and "the high places of heaven," and *Altiora petamus* was suggested as an alternative motto. In the end the Secretary of State settled the argument by a characteristic minute that concluded, "If nobody can think of a better motto within the next two days, secure Admiralty concurrence and submit to the King. J.S."

The Admiralty's concurrence was somewhat half-hearted in that they did not consider a motto necessary for the Royal Flying Corps, but they did not actually object, and after approval by the King the motto was duly published in Army Order 111 of 1913, which read,

> Honorary Distinction: His Majesty The King has been graciously pleased to approve of the Royal Flying Corps being permitted to adopt the motto *Per Ardua ad Astra*.

The next emblem to appear after the motto was the roundel, which dates from November, 1914. The original four squadrons that flew to France in August, 1914, had no distinguishing markings on them, but these were quickly found necessary and Union Jacks were painted on the undersides of the wings and on the sides of the fuselages. Many photographs exist showing the Union Jacks on the aircraft in France at that time.

The Union Jacks, however, were found misleading. They were frequently mistaken for the black crosses on the German aircraft, and on 12th November, 1914, it was eventually decided to use the roundel in use by the French, but with the colours in reverse, i.e., red centre and blue on the outside instead of blue centre and red outside. This had the great advantage that both French and British aircraft carried broadly similar identification marks. The Union Jacks were retained in addition on some aircraft, but gradually went out of use.

At the same time that the roundel was introduced in the Royal Flying Corps, parallel but independent action was being taken by the Admiralty. Union Jacks had similarly been found unsatisfactory and on 8th December, 1914, the Air Board ordered roundels to be painted on naval aircraft. It was, however, a different roundel from the one in use in the Royal Flying Corps, having a white centre surrounded by a red ring. When Squadron Leader Longmore, who was then commanding No. 1 Naval Wing in France, pointed out that his roundels were different from those of the Royal Flying Corps Wing with which he was operating, he was told that he could "paint his wings in any way he liked when attached to military wing," and thereafter the Royal Naval Air Service gradually fell into line with the Royal Flying Corps.

Apart from minor differences such as the abolition of the white circle from night-flying aircraft, there was considerable variation throughout the First World War in the size of the roundels and in the relative widths of the three colours, but from 1917 to the end of the war the general custom seems to have been to have the large red spot as in the roundel in use today.

After the First World War there were further changes in the roundel, and the position was complicated by the introduction of the newly approved R.A.F. Ensign in 1920. On the Ensign all the colours in the roundel are of equal width, and this is the standard roundel of the Force. As such it was commonly used on aircraft between the wars, but during the Second World War there were several variations to meet operational requirements in different theatres.

Since the end of the war in 1945 there have been further differences of opinion as to the best proportions for the roundel on aircraft, but in the end A.M.O. A.413/47 was issued, which laid down that the roundel with the large red centre, as originally used for at least part of the First World War,was to be the standard roundel for aircraft and M.T. Fighter Command protested, as they wished to retain the roundel with the small red centre which they were then using, but they were over-ruled, and so today the Royal Air Force has two roundels—one with the large red centre for use on aircraft and M.T., and the other of standard design, approved by the King and registered with the College of Heralds, for the R.A.F. Ensign and the R.A.F. Yacht Club's burgee.

The roundel may seem a prosaic subject at first sight, but it is in fact instinct with the tradition of the Royal Air Force, having been borne in peace and war throughout its history on its aircraft in all parts of the world, and before that on the aircraft of the Royal Flying Corps and the Royal Naval Air Service.

Once the Royal Air Force was formed the question of a crest came up for early consideration and a design very similar to the one in use today was adopted in August, 1918, except that the circlet surrounding the eagle consisted of a garter and a buckle, but at that time the crest was not submitted to the King or the College of Arms for approval. The original designer of the crest is unknown, but it was said at one time that he was a member of Gieves Ltd., and that the bird he drew was an albatross instead of the eagle that was eventually adopted.

When the full dress uniform was approved by the King in 1922, it was decided that the crest should be the same as the badge worn on the full dress head-dress, namely the crown and eagle with circlet, and that the original crest with the garter and buckle should no longer be used. On this occasion the new crest was submitted to the College of Arms for registration on 25th January, 1923, the covering letter stating that the design had received the approval of the King together with other details of R.A.F. uniform.

In 1925 the College of Arms produced a coloured sketch of the R.A.F. crest, and this has been used from time to time when it was necessary to produce a design in colour, as for instance on drums for the Air Force.

Doubts as to the merit of the 1923 crest have arisen periodically, and particularly in regard to the eagle. As late at 1941 it was suggested that a more warlike eagle might be adopted. Some of the alternative designs then proposed were described as looking like enraged cockatoos, and like other previous suggestions for a change this one was also quietly dropped, leaving the 1923 crest, or badge as it is now usually called, still holding the field.

The last emblem to be considered, the R.A.F. Ensign, had a much more stormy history. The Navy, very understandably, objected to the newly formed Air Force having an ensign in any way resembling the three naval ensigns, and in fact they objected to the Royal Air Force having any ensign at all.

The question of an ensign was one of the first matters considered by the Air Council following the formation of the Royal Air Force. When Wing Captain Swann, the officer commanding at Stenness, Orkney, got quickly off the mark and asked on 7th April, 1918, what flag stations and units should fly, the Air Council replied that the matter was under consideration.

On 11th May, 1918, the Air Ministry wrote to the Admiralty, War Office and College of Heralds forwarding two designs for a R.A.F. Ensign, and asking for their views. The Admiralty's views were not at all favourable—in fact they did not think that an ensign was in any way appropriate to the Royal Air Force.

Various alternative proposals were then considered, and at one stage Sir Rosslyn Weymms of the Admiralty made the point that " 'ensign' as applied to a flag or banner, although by dictionary not strictly confined to maritime flags has, in fact, become so restricted in the British Empire. The term has long been employed when speaking collectively of the three British maritime flags only, i.e., the White, Blue and Red Ensigns." In obtaining its ensign the Royal Air Force therefore at the same time gave a new meaning to the word.

On 17th April, 1919, General Seely, by this time Secretary of State for Air, flew to Windsor in an airship to show the King the latest version of the proposed new flag, which resembled in some respects the naval White Ensign.

One extract from the lengthy letter which General Seely wrote to Lord Cromer on the following day gives an interesting sidelight on the airships of the day.

"It only remains for me to add on this point that I hope the King will forgive me for having arrived half an hour later than was intended and therefore possibly at an inconvenient time. The fact is that this particular airship is an experiment which has proved a failure, we shall never build another of that description—if you drive her at 35 knots she pitches so badly that you lose speed. Yesterday at one o'clock the wind was blowing about 30 knots at 500 feet, and we were actually passed by a slow motor lorry going along the road below us—so we had to dodge along just over the tops of the trees."

The letter concluded, "But the Admiralty themselves fly the White Ensign on all our airships—the White Ensign was flying in the ordinary course at the stern of the ship which I took to Windsor yesterday, it has flown on all the ships that rendered such admirable service in the air throughout the war. The fact is that the problem of mastering the air is closely akin to the problem of mastering the sea—and our race of men will win through in the air as they have done on the sea. It would be deplorable for jealousy to arise between two Services so closely related and so vital both to our safety and well being."

The next occasion when the Ensign was flown past the sovereign was at the Coronation Review at Odiham on 15th July, 1953, when the Sycamore helicopter leading the fly past flew a R.A.F. Ensign from a weighted cable.

In spite of the novel way in which the suggested Ensign was displayed the King did not approve this design, particularly because of its resemblance to the White

Ensign, and intimated that in fact he would not be prepared to approve any flag which was not agreed between the Air Force and the Navy.

Time went on and many more letters passed between the Admiralty and the Air Ministry. Suggestions were also made in various quarters, and Sir Winston Churchill came into the picture in November, 1919, when as Secretary of State for War and Air he wrote, "Get hold of that advertisement of the *Daily Herald's* which was on all the hoardings of London some time ago and let me see it." This was a futurist poster depicting an aeroplane, and including a drawing of an ensign. The artist, Mr. Kauffer, was asked to submit some further designs but in the end none of them was accepted.

Eventually the Ensign in use today was evolved, and finally approved by the King on 20th June, 1920, subject to the agreement of the Admiralty being obtained. This they did at length, though somewhat reluctantly, pointing out that, heraldically, no distinction could be drawn between different shades of blue, and that the proposed flag was therefore a defaced Blue Ensign. The Ensign was registered with College of Heralds on 9th September, 1920, and AMO 1130/1920 authorised the flying of the R.A.F. Ensign by headquarters, stations and units, and by airships. The history of the Ensign ends with the publishing of an Order in Council of 24th March, 1921, in A.M.W.O. 273/1921.

The Ensign as finally approved included the roundel in the centre of the fly. It is interesting to note, however, that the idea of including the roundel on the Ensign apparently did not originate with the Air Force. The first mention of this idea which has been found is in the letter which Sir Rosslyn Weymms wrote to General Seely in April, 1919, giving the naval view on a possible flag for the Air Force. A sketch of several alternative designs acceptable to the Admiralty were enclosed with this letter, and a roundel was included in some of them.

On 4th October, 1919, a boy at Blundell's School, D. A. G. Smith, wrote to the Air Ministry enclosing four suggested designs for the Ensign. Although he was informed that it was regretted that none of them had been found suitable for adoption by the Service, one of the designs was the White Ensign without the St. George's Cross, but with a roundel in the fly. Except therefore that this ensign was white instead of Air Force blue, it closely resembled the ensign eventually adopted, and this schoolboy can therefore probably be regarded as having the biggest claim to be the designer of the R.A.F. Ensign.

A design embodying the roundel was first brought before the Air Council on 20th February, 1920, and all the designs considered subsequently included the roundel. Having been carried on all the aircraft of the Royal Air Force throughout its history the roundel is therefore the most symbolic of all the emblems, and it is therefore peculiarly fitting that it should be part of the R.A.F. Ensign. This was well recognised in the official communique issued on 31st December, 1920, which read, "The inclusion of the Royal Air Force marking, which has become familiar to all as the recognition mark on British Service aircraft, is appropriate in that it is the symbol under which many thousands of gallant actions have been fought in the air, and many thousands of British flying officers have been wounded or have met their death."

It can be seen therefore how emblems such as the roundel, which may appear of minor importance in themselves, gradually acquire a symbolic significance, and thus play a large part in building up the traditions of the Royal Air Force.

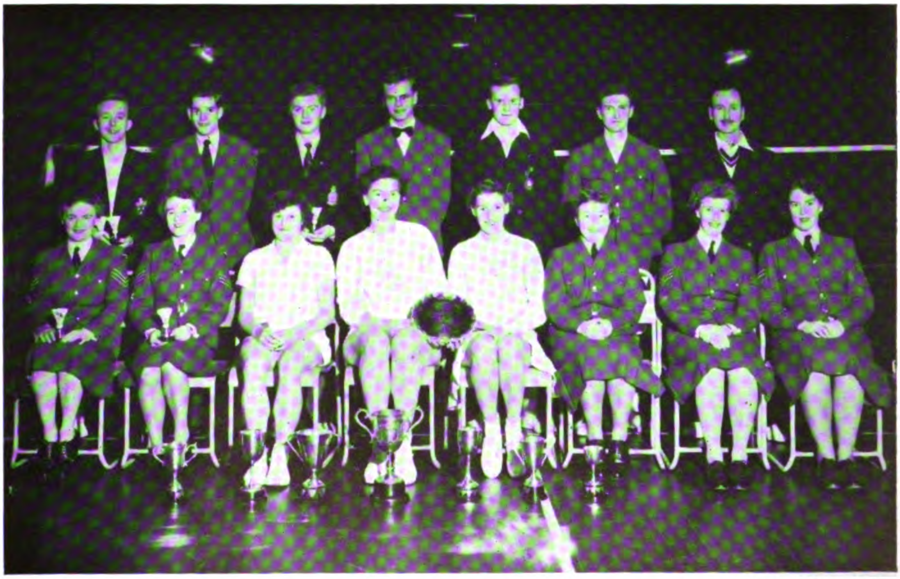
FOOTNOTE.—Grateful acknowledgment is made of the assistance received from Mr. E. W. R. Traviss, M.B.E., of the Air Ministry, who has very kindly provided the notes on which this article is based.

R.A.F.—BADMINTON

BY SQUADRON LEADER C. J. LANDREY, R.A.F.

THE 1954-55 season has been the most ambitious and successful for the Royal Air Force Badminton Association since it started in September, 1947. The Individual Championships attracted a record entry of 322 competitors, of whom just on 300 turned up to play. They were held at Royal Air Force St. Athan, where the six courts were occupied from 9.30 in the morning till late at night every day for four days, the semi-finals and finals being played on the fifth day, Friday, 26th November, 1954. As was expected Junior Technician Swarbrick won the R.A.F. Singles competition but, playing with a scratch partner, lost the doubles to Senior Aircraftman Kniveton and L.A.C. Turner. Swarbrick, however, came into his own again when with Flying Officer Meats he won the R.A.F. Station Pairs competition. The mixed doubles was won by Leading Aircraftman Turner and Corporal Napper, again playing against Swarbrick and Sergeant Wyatt. The W.R.A.F. Singles title was captured for the second year running by Sergeant Wyatt, and she and Sergeant Ring also retained the W.R.A.F. Doubles title. The W.R.A.F. Station Pairs competition was won by Sergeant Longmuir and Sergeant Bogue.

The Inter-Command Competition was again played at St. Athan and this year for the first time it was played on the lines of a county match, with the R.A.F./W.R.A.F. competitors combining to form one team from each Command. Technical Training Command retained the title by defeating Fighter Command by 12 games to 3, and it was once again Technical Training Command's much stronger women who enabled the match to be won by such a margin. It was felt that this way of running the Command Tournament was a great improvement on that of previous years, though the shortage of girls in some of the Commands made selection very difficult. A further advantage was that it was discovered that the tournament could now be played off in two days instead of three.



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Winners of Individual Championships, November 1954.

On the 25th March the finals of the Inter-Station Competition were played off at Wimbledon. The main R.A.F. Competition was won by St. Athan for the first time since 1949, when they defeated Yatesbury, though the outcome of the match was doubtful right up to the last point. The consolation competition for those stations knocked out in the first and second rounds was won by Marham, a Bomber Command Station, who defeated Hereford in the final. The W.R.A.F. Inter-Station Competition was won by the W.R.A.F. depot at Hawkinge, who triumphed over Halton. This season the new Mixed Inter-Station Competition was introduced and this proved to be very popular, St. Athan finally coming through as the winners from Neatishead.

During the course of the season various matches were played both by the R.A.F. and W.R.A.F. teams. The R.A.F. opened the season with a match against a Scottish team who defeated the R.A.F. by 7 matches to 2. Scotland used this game from a trials point of view and it is to be hoped that further matches will be arranged in the future. Other matches played by the R.A.F. included those against Cambridge University (two), Staffordshire, South Wales, and Norfolk, and a team also competed in the Kent Open Championships. The W.R.A.F. played against South Wales, University of London, Wimbledon Ladies, and took part in the Bath Tournament.

The season terminated with a visit to the United Kingdom of the Chartlottenlund Badminton Klub. This club, a civilian one, in 1952 and 1954 entertained twelve members of the R.A.F. team for some ten days on each occasion. It was decided that an effort should be made to repay the hospitality of the Danish people. The Charlottenlund Badminton Klub team consisted of ten men and six ladies plus the team manager and his wife. The team arrived in London on 26th March, returning to Denmark on 3rd April, 1955. During their stay they were accommodated for the first two and last two nights at the Officers' Mess at R.A.F. Uxbridge, and the other four nights they were the guests of married officers at Royal Air Force Thorney Island. Three matches were played, the first on the courts of the Nuffield United Services Officers' Club at Portsmouth, where the American type of tournament was played. The R.A.F. managed to beat the Danish men by 317 pts. to 287, but the W.R.A.F., although winning by 5 games to 4, lost on points to the ladies by 117 to 98. The second match, again in Portsmouth, took the form of four men's singles, of which three were won by the R.A.F.; five men's doubles, four of which were won by the R.A.F.; three ladies' doubles, one of which was won by the W.R.A.F.; and six mixed doubles, three of which were won by the R.A.F./W.R.A.F. The R.A.F. Badminton Association therefore won by 12 matches to 6. The final match was played at Stanmore Park and took the form of a mixed knock-out tournament. A few ex-R.A.F. players who went to Denmark in 1952 were invited to play in this and, with the partners they had brought with them, contested the final match, which was eventually won by Lockwood and Miss Walker, who defeated Ciriglio and Miss Ripley 15—13, 15—9.

The Secretary of the Royal Air Force Badminton Association (Squadron Leader C. J. Landrey, R.A.F. Thorney Island, Emsworth, Hants) would like to thank all those county and club secretaries who have written to him during this season regarding their younger players called up for National Service. It is to be hoped that this correspondence will continue in the future, as it is of obvious benefit to both the Royal Air Force and to the counties.

CURRENT EVENTS

GREAT BRITAIN

Sapphire 9 Announced

The existence of another engine in the Armstrong Siddeley Sapphire series is revealed. This is the Sapphire 9.

Its performance is still secret but the Sapphire 7 has already been officially type tested at 10,200-lb. thrust.

Aircraft Industry's Labour Force

The labour force of the British Aircraft Industry continues to rise steadily at a rate of about 2,000 a month. The official total stood at 240,900 in January this year, the latest month for which figures are available. This showed an increase of 1,900 on the previous month and an increase of 11,700 since January, 1954. About one-seventh of the force are women.

R.A.F's Front Line

The number of fighters in the front-line of the R.A.F. has increased by 35 per cent. in the past three years and the night-fighter element by 170 per cent. Bomb-carrying capacity of Bomber Command is now more than 25 per cent. greater than it was a year ago. Two years ago, only 20 per cent. of Bomber Command aircraft were jets, now nearly all are. (*Hansard*).

Accident Rate

R.A.F. fatal-jet-accident rate is now less than one sixth of the rate when jet aircraft were first in full service and only half of what it was two years ago. The fatal-accident rate for all types of aircraft is less than one quarter what it was in 1921 when the R.A.F. was equipped with DH.9a bombers and Bristol fighters. (*Hansard*).

Production Rate

The present rate of aircraft delivery to the Services appears to have risen to nearly 250 a month. During February and March of this year it is calculated that a total of somewhere near 500 will be delivered, bringing the aggregate available since November, 1951, to nearly 6,000. This figure includes over 200 Hawker Hunters. (*Financial Times*).

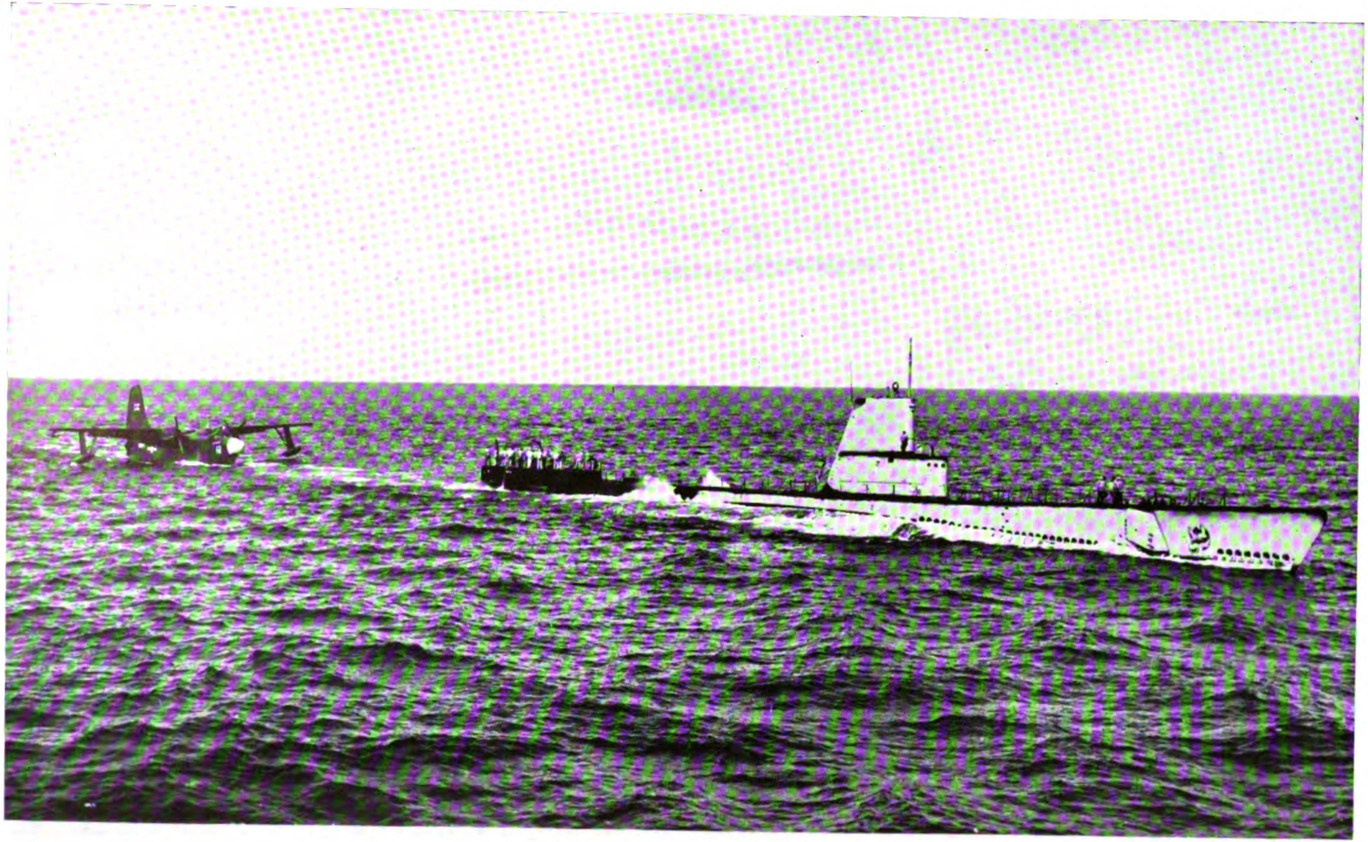
High-speed Reinforcement of Middle East Bomber Force

Recently two English Electric Canberra bomber squadrons reinforced Cyprus from Britain in six hours' flying time. Last month a Canberra flew from Lincolnshire to Nicosia in Cyprus, a journey of 2,000 miles, in four hours thirteen minutes.

Canberras are already making hundreds of flights annually to overseas bases in all parts of the world, lending powerful support to British air power wherever they are needed.

English Electric P.1

Sir George Nelson, Chairman of English Electric, recently announced that the P.1 fighter had made more than 70 flights, most of them at supersonic speeds.



RE-FUELLING TEST.

The submarine-oiler U.S.S. Guavina in forward movement, refuels the P5M Martin Marlin patrol seaplane in the open sea.

UNITED STATES OF AMERICA

Open-Sea Seaplane Refuelling Tested by Navy

IN a recent exercise in the Caribbean, the Navy tested an important new element of its mobile striking power—refuelling a seaplane in the open sea from a moving submarine.

The two-week operation conducted by Commander Submarine Force Atlantic Fleet involved a twin-engine P5M Martin Marlin patrol seaplane from a Navy squadron based at Norfolk, Va., and the submarine-oiler U.S.S. Guavina.

Submarine-seaplane refuelling is an element which top Navy officials are mentioning with increasing frequency in their plans to implement the Navy's new concept of "mobile sea bases." Admiral Robert B. Carney, chief of Naval Operations, stated that "an elusive force of submarine-supported seaplanes" is one of the ways this country can retain "freedom of action" in striking back against an aggressor from "many directions."

At a press conference in Washington, Assistant Secretary of the Navy for Air James H. Smith, Jr., mentioned the increased mobility which submarine refuelling will give the Navy's new 600-mile-per-hour jet flying-boat, the XP6M-1 Martin Sea-Master, due to be flight tested this spring at Baltimore:

"You could have a concept of small task forces which, rather than relying on land as a base, rely on the sea as a base, and the Navy is in that business. We have developed, of course, flying-boats for a number of years. At the moment, we have a project of a major jet flying-boat which would have the capability of operating somewhat in that fashion as an extremely mobile force which could really be set down almost any place in the world where you have a reasonable amount of water. It can be supported favourably by a submarine tanker, therefore it has a tremendous amount of mobility, unpredictability, and invulnerability because of the rapid rate at which it moves. . . ."

FRANCE

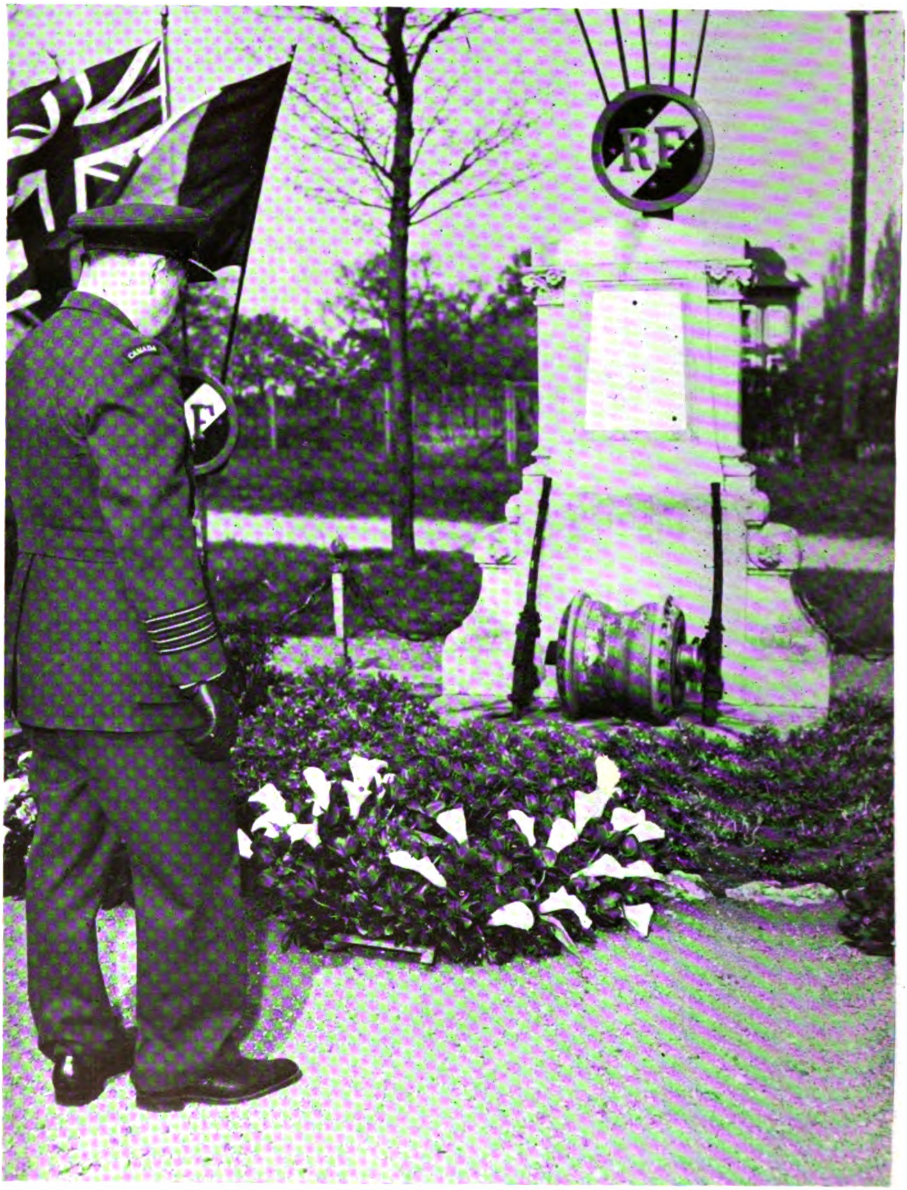
Memorial to R.C.A.F.

A unique memorial ceremony, an annual event since Nazi occupation forces were driven out of France, in the town of Maisons-Lafitte, fifteen miles from Paris, was held recently by citizens of the town commemorating five Canadian airmen who lost their lives in the Second World War during a raid on near-by wartime targets.

On 29th April, 1942, an R.C.A.F. squadron was assigned the difficult task of destroying two large, heavily defended bridges near Maisons-Lafitte. The Canadian bomber force was successful in blowing out the bridges, but with the loss of three aircraft which were hit by intense anti-aircraft fire and exploded in mid-air.

The local French inhabitants searched the wreckage, then hid the remains of it and later held burial services for five unknown R.C.A.F. airmen whose bodies they recovered. Each night, following the burial services, the people of Maisons-Lafitte placed flowers on the five Canadian graves. Each morning the floral tributes were removed by German occupation troops, with warnings to the town populace of heavy penalties for any repetition of such acts. Despite the strong warnings and resulting penalties, flowers continued to appear daily on the graves.

In 1946, with Nazi occupation troops driven out of France, a memorial was erected to commemorate the five unknown Canadian airmen, from funds raised by voluntary contributions from the citizens of this small French town.



[*National Defence Photo*

The hub of an aircraft wheel and two machine guns complement a memorial to five Canadian airmen at Maison-Lafitte, where they were shot down on completion of a mission in 1942. Group Captain D. Armour, R.C.A.F. has just placed a wreath at the 1955 annual ceremony.

Ski-ing as Fitness Course for Fighter Pilots

In a winter wonderland high in the French Alps more than 40 Canadian fighter pilots of the R.C.A.F's. N.A.T.O. Air Division have been guests this winter at the French Air Force ski school at Les Allues, about 50 miles east of Grenoble.

Part of the R.C.A.F. physical fitness programme for jet pilots, the two-week curriculum is designed to put them in top physical condition. Although the routine is strenuous the course is, for the Canadians, the most popular in Europe, and there are always more applicants than vacancies.

The French ski school caters for all degrees of proficiency. Whether the pilot is a champion skier or completely new to the sport, there is a course for him. All instruction is carried out by a team of top-flight skiers, called monitors, drawn from the French Air Force.

Commenting on their ski-ing ability, the commander of the French school stated that the majority of the Canadians are fair skiers when they arrive and are generally very good by the time they leave. As proof he said that last year a Canadian pilot formed part of the three-man team which won the inter-hotel ski competition in the valley.

The course is conducted in at atmosphere of complete informality, and French-issue ski clothing takes the place of uniforms. During their stay, French and Canadian students bunk together and eat together in a high mountain chalet.

Keeping fighter pilots fit at Ski-Schule at Meribel-les-Allues in the French Alps, where they handle skis instead of F-86 Sabre jets.

Private Flying Clubs

Flying for pleasure and in their own time is no longer a dream for more than 100 officers and men at R.C.A.F. Station Rockcliffe near Ottawa.

Members of the newly-formed Rockcliffe Flying Club were recently granted their charter to operate a private flying club from the Royal Canadian Flying Clubs Association—the first such club to operate in Canada.

The club is patterned after a similar organization at R.C.A.F. Station North Luffenham in England, where early last summer a group of Air Force personnel got together and decided to do something about the high cost of private flying.

Early last fall a group at Rockcliffe became interested in the possibilities of forming a similar organisation in Canada, and a meeting of all those interested in private flying was called. The response was overwhelming, and with the co-operation of Group Captain A. M. Jardine, commanding officer of Station Rockcliffe and now honorary president of the organization, the club was formed.

Shares were purchased by the members, and an application was made for a charter. Four light aircraft were purchased and ground training classes commenced. The club is now operating from Carp Airport near Ottawa.

Flying Officer C. I. Adam, president and prime mover in the organization from Air Material Command Headquarters at Rockcliffe said the club will provide recreational flying and instruction for aircrew and non-aircrew members. "It will also provide facilities for members to obtain private flying licences at reduced cost," he said. "The planes will also be available for week-end hunting and fishing trips for Air Force personnel."

SWITZERLAND

Flug and Fahrzeugwerk P.16

Another new prototype announced this week brings the number of aircraft powered by the Armstrong Siddeley Sapphire jet engines to the remarkable total of fourteen.

The newcomer is the hitherto secret Swiss Flug and Fahrzeugwerk P.16 interceptor, which has made a successful first flight.

The P.16, which is fitted with a Sapphire engine of over 8,000 lb. s.t., has been specially designed by the Swiss to meet the peculiar conditions of their mountainous terrain. With airfields surrounded by high peaks, the specification for the P.16 called for an exceptionally rapid rate of climb and short take-off run.

The Sapphire's high thrust, light weight, and immediate response to acceleration made it an obvious choice for the P.16. Its excellent surge-free behaviour during gun firing is also of particular value because the P.16 is known to carry exceptionally heavy armament.

SWEDEN

Closed Circuit Speed Record

A new closed-circuit speed record of 900.65 kilometres per hour (about 560 miles an hour) has been set up by two Swedish Air Force SAAB J.29 fighters fitted with de Havilland Ghost engines.

The new record was established over a 1,000-kilometres (620 miles) circuit in Sweden. The Ghost engines fitted to the J.29's were built under licence in Sweden by Svenska Flygmotor and are of the same type as those used to power the de Havilland Venom day and night fighters of the Royal Air Force and the Sea Venom all-weather fighters now in service with the Royal Navy.

CONCERNING PERSONNEL

NEW APPOINTMENTS

AMONG the promotions and appointments of Royal Air Force personnel announced by the Air Ministry since the publication of the April, 1955, number of AIR POWER, are the following:

AIR MINISTRY

Air Vice-Marshal A. F. Hutton, C.B., C.B.E., D.F.C., as Director-General of Engineering.

Air Vice-Marshal W. C. Sheen, C.B., D.S.O., O.B.E., as Director-General of Manning.

BOMBER COMMAND

Air Vice-Marshal S. O. Bufton, C.B., D.F.C., as Senior Air Staff Officer at Headquarters (in October).

Air Commodore R. A. R. Rae, O.B.E., as Officer Commanding Royal Air Force Station, Boscombe Down.

FIGHTER COMMAND

Air Commodore R. C. Mead, C.B.E., D.F.C., A.F.C., A.D.C., as Air Officer Commanding No. 81 Group (in August).

Air Commodore M. W. S. Robinson, C.B.E., as Sector Commander, Caledonian Sector.

Air Commodore F. Crerar, C.B.E., A.D.C., as Honorary Air Commodore of No. 612 (County of Aberdeen) Squadron, No. 2612 (County of Aberdeen) Light A.A. Regiment Squadron and No. 3612 (County of Aberdeen) Fighter Control Unit of the Royal Auxiliary Air Force.

TRANSPORT COMMAND

Air Vice-Marshal A. McKee, C.B., C.B.E., D.S.O., D.F.C., A.F.C., as Air Officer Commanding-in-Chief (in October).

Air Commodore C. E. Hartley, as Senior Technical Staff Officer at Headquarters.

TECHNICAL TRAINING COMMAND

Air Marshal G. R. Beamish, C.B., C.B.E., as Air Officer Commanding-in-Chief (in September).

Air Vice-Marshal J. F. Franks, C.B., C.B.E., as Senior Air Staff Officer at Headquarters, Technical Training Command.

Air Vice-Marshal G. B. Beardsworth, C.B., as Air Officer Commanding, No. 24 Group.

MAINTENANCE COMMAND

Air Vice-Marshal F. G. S. Mitchell, C.B.E., as Air Officer in charge of Administration at Headquarters, Maintenance Command.

Air Vice-Marshal R. G. Hart, C.B., C.B.E., M.C., as Air Officer Commanding No. 41 Group.

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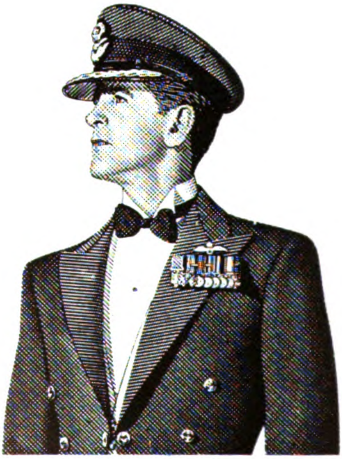

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2ND TACTICAL AIR FORCE

Air Vice-Marshal W. P. G. Pretty, C.B.E., as Air Officer in charge of Administration at Headquarters, 2nd Tactical Air Force.

ADEN

Air Vice-Marshal H. A. V. Hogan, D.F.C., as Air Officer Commanding British Forces, Aden (in September).

CEYLON

Air Commodore H. W. Mermagen, C.B.E., A.F.C., as Air Officer Commanding, Royal Air Force, Ceylon.

PAKISTAN

Her Majesty's Government in the United Kingdom have placed at the disposal of the Government of Pakistan the services of Air Vice-Marshal A. W. B. McDonald, C.B., A.F.C., Royal Air Force, for appointment as Commander-in-Chief of the Royal Pakistan Air Force.

U.S.A.

Air Commodore G. F. W. Heycock, D.F.C., as Senior Air Staff Officer, British Joint Services Mission, Washington, D.C.

IRAQ

Her Majesty the Queen has been graciously pleased to approve of the appointment of His Majesty King Feisal II, G.C.V.O., of Iraq, to the Royal Air Force, in the honorary rank of Air Vice-Marshal.

GROUP CAPTAINS' APPOINTMENTS

Group Captain C. Broughton, C.B.E., to Headquarters, Far East Air Force, for air staff duties.

Group Captain H. E. Hopkins, D.F.C., A.F.C., to Headquarters, Far East Air Force, for administrative staff duties.

Group Captain D. Finlay, C.B.E., to the Air Ministry for duty in the Department of the Air Member for Personnel.

Group Captain E. M. T. Howell to the Institute of Armament Studies, Indian Air Force.

Group Captain G. R. Montgomery, C.B.E., to Headquarters, 2nd Tactical Air Force, for air staff duties.

Group Captain R. N. Bateson, D.S.O., D.F.C., to Washington, D.C., for staff duties with the N.A.T.O. Standing Group.

Group Captain S. G. Birch, M.V.O., O.B.E., to R.A.F. Middle Wallop, to command.

Group Captain W. C. Oldbury, C.B.E., D.F.C., to R.A.F. Manston, to command.

Group Captain A. N. Smythe, D.S.O., D.F.C., A.F.C., to R.A.F. North Luffenham, to command.

Group Captain D. E. Wenham, M.C., to Headquarters, Far East Air Force, for air staff duties.

Group Captain D. W. Smythe to Air Ministry for duty in the Department of the Air Member for Personnel.

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Group Captain K. R. Coates to R.A.F. Bahrein, to command.

Group Captain M. P. C. Corkery, A.F.C., to Headquarters, Flying Training Command, for administrative staff duties.

Group Captain C. M. Wight-Boycott, D.S.O., to Air Headquarters, Malta, for air staff duties.

Group Captain R. Harston, to No. 4 Maintenance Unit, to command.

Group Captain W. MacI. King, to No. 107 Maintenance Unit, Middle East Air Force, to command.

Group Captain G. A. L. Manton, to Allied Air Forces Northern Europe, for staff duties.

Group Captain D. Peveler, D.S.O., D.F.C., to R.A.F. Gutersloh, Germany, to command.

Group Captain C. E. Slee, M.V.O., A.F.C., to Headquarters, Maintenance Command, for administrative staff duties.

Group Captain D. G. Keddie, to Headquarters, Coastal Command, for air staff duties.

Group Captain R. B. Thompson, D.S.O., D.F.C., to Headquarters, Coastal Command, for air staff duties.

Group Captain A. J. Mason, D.F.C., to R.A.F. Bircham Newton, to command.

Group Captain K. W. Godfrey, R.A.F. Regiment, to Headquarters, Technical Training Command for air staff duties.

Group Captain P. H. Stibbs, to Air Ministry for duty in the department of the Air Member for Supply and Organization.

Group Captain P. H. R. Saunders, to Air Ministry for duty in the Department of the Chief of the Air Staff.

Group Captain G. P. Seymour-Price, D.F.C., to S.H.A.P.E., for staff duties.

Group Captain C. H. Simpson to the R.A.F. College, Andover, for directing staff duties.

Group Captain D. W. Smythe, to No. 4 Maintenance Unit, to command.

RETIREMENT

Air Marshal Sir Victor E. Groom, K.C.V.O., K.B.E., C.B., D.F.C. (September, 1955.)

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BOOK REVIEWS

Canada's Flying Heritage. By Frank H. Ellis. (University of Toronto Press. Published in England by Oxford University Press, Amen House, Warwick Square, London, E.C.4. 388 pp. Fully illustrated. 63s.)

In the autumn of 1907 two young Canadian engineers named Casey Baldwin and John McCurdy visited the aging inventor, Dr. Alexander Graham Bell, at his home in Baddeck, Nova Scotia. They discussed the possibilities of powered flight so enthusiastically that Mrs. Bell suggested they should form a company to test their ideas in practice. So was born the Aerial Experiment Association, which, with all due respect to the Wright biplane, led to the first completely practical aeroplanes in both the United States and Canada.

Dr. Bell invited a young American named Glenn Curtiss to join the Association, because of his knowledge of petrol engines. A fifth member—Lieutenant Thomas Selfridge—was sent by the U.S. Army as an official observer. All five designed aeroplanes, which were built and tested near Curtiss's machine-shop at Hammondsport, New York. The two best were Curtiss's *June Bug*, which started the whole long succession of great Curtiss aeroplanes, and the *Silver Dart*, in which McCurdy made the officially recognized first flight by a British subject anywhere in the Empire at Baddeck on 23rd February, 1909.

John McCurdy is still alive. So are Billy Bishop, Canada's great 1914-18 War fighter ace (72 victories); Wallace Turnbull, who invented and flight-tested the controllable-pitch propeller in 1927; many of the men who pioneered the art of "bush flying" in northern Canada; their present-day counterpart, Carl Agar, the pioneer helicopter operator; and the newer generation of Canadians who have designed, built and flown some of the world's finest all-weather jet-fighters, light transport and training aircraft.

In Britain we know all too little about Canada's Flying Heritage, except for the latest achievements and a few of the early ones. This book does more than educate us—it entertains its readers with stories of adventure in the frozen north as exciting as any novel. It contains a priceless collection of hundreds of illustrations, ranging from a "flying saucer" of 1907 to reproductions of valuable air mail letters and a picture of a doped horse being loaded into a "bush" freighter on a stretcher!

Written by Frank Ellis, who built and flew his own aeroplane at Calgary before August, 1914, it is a book to be proud of, and a "must" for every Station library or collector's bookshelf.

J.W.R.T.

With the Australians in Korea. Edited by Norman Bartlett. (Australian War Memorial, Canberra. 294 pp. Illustrated. 25s.)

If you have already read the history of the achievements of No. 77 Squadron of the Royal Australian Air Force in the Korean War,* you might consider it a waste of money to buy this new book. This would be a mistake; for Norman Bartlett has gathered together a first-class collection of stories and pictures that cannot fail to interest members of all three Services.

Quite apart from the chapters devoted to the work of the Royal Australian Navy and Army, there are many new details of the air battles in Korea. Official statistics show that in just over three years of active operations No. 77 Squadron flew 4,836 missions and lost 42 pilots. In 18,872 individual sorties members of the squadron destroyed 3,700 buildings, 1,500 vehicles and 16 bridges, as well as shooting down six enemy aircraft, three of them MiG-15's.

Here too, in cold statistics and heart-warming narrative, is the war record of No. 36 Transport Squadron of the R.A.A.F., whose Dakotas carried 100,000 passengers, 13,500,000 lb. of mail and freight, and evacuated 12,000 wounded from Korea in all weathers, by day and night.

Here also are descriptions of the work done by the Sea Fury and Firefly aircraft of H.M.A.S. *Sydney*, and tributes to the courage and efficiency of the helicopter pilots of the U.S. rescue service, who picked up several crashed R.A.A.F. pilots behind the enemy lines. And, lest we forget that comradeship is stronger even than death, here is the story of two men who risked their lives to search for the body of a missing pilot.

J.W.R.T.

**Across the Parallel* by George Odgers (Heinemann, 21s.)

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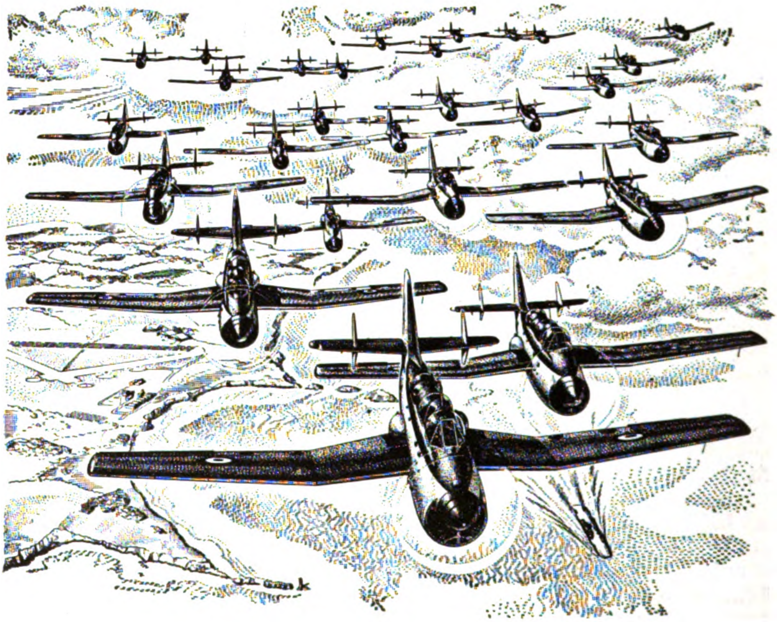

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Down in the Drink. By Ralph Barker. (Chatto & Windus, London. 249 pp. 10 illustrations. 12/6 net.)

A series of eight dramatic and moving stories provided from material collected from members of the Gold Fish Club, those who had been forced to land from the air into the sea during the Second World War.

The stories of the experiences of these men from all corners of the British Commonwealth are vividly told, each one packed with excitement, heroism and above all human endurance and the tragic deaths of those engaged in rescue operations.

By primitive instinct man hangs on to life and when reading of the fight to live, against unimaginable odds depicted in some of the experiences recorded, there seems to be no limit to endurance and human courage.

One particularly moving story is that of an aircrew of seven who spent five days tossing about in a dinghy in the Bay of Biscay while British and German aircraft and air/sea rescue launches competed in a fantastic race which ended in the rescue of the ditched crew, but at a cost of seventeen British lives: seventeen to save seven.

The endurance of another aircrew, who spent ten and a half days cramped together in a small dinghy at sea, six days without water, is selected by the author as an example of the fortitude with which brave men of our air forces faced what appeared hopeless chances of survival.

This book not only provides interesting reading but will make widely known how hardly earned was that small badge worn by members of the Gold Fish Club.

A.H.S.

The First and the Last. By Adolf Galland. (Methuen & Co., 36 Essex Street, London, W.C.2. 368 pp. Illustrated. 18s.)

Adolf Galland will probably be the Commander-in-Chief of Western Germany's new *Luftwaffe* when it is formed in the near future. For that reason alone, his memoirs cannot be ignored. They represent the first fairly comprehensive survey of the birth, life and death of Hitler's *Luftwaffe* written by one of its leaders; and they leave the discerning reader shocked by the past and apprehensive for the future.

One must bear in mind continuously that this book was written by a German primarily for Germans. We in Britain regard the formation of the *Luftwaffe* in the early thirties, when its fighters and bombers flew in civil markings and its pilots trained in Italy, as a dishonest breach of international agreement. Galland sees it as a rebirth of respect and greatness in his country. We deplore Germany's intervention in the Spanish Civil War. Galland proudly led one of the *Luftwaffe's* fighter squadrons there and developed the new technique of ground attack.

It is difficult to reconcile some memories of the Battle of Britain with Galland's remark that "to shoot at a pilot parachuting down would have seemed to us then an act of unspeakable barbarism." And, all through the book, there is a tendency to blame defeat on the shortcomings of *Luftwaffe* equipment, policy and leadership, rather than on the courage, fighting ability, superior equipment and leadership of the Allies.

We seldom receive full credit for being brighter than our enemies, except for our development of radar and of the Mosquito.

Nevertheless, this book is of the greatest interest and value, because it brings to light mistakes made by both sides. It emphasizes that the daylight Battle of Britain was limited to the skies over south-east England by the inadequate range of the Me.109; and points out the mistake of making fighters fly close escort to bomber formations. No attempt is made to hide the discontent of *Luftwaffe* fighter pilots who were switched to fighter-bomber and ground-attack duties. And Galland leaves little doubt that if the Allies had concentrated the full weight of their bomber offensive on petrol targets from the start, the war might have been over much more quickly.

Although he was made General in command of German fighter units, Galland seldom agreed with his superiors and was finally "sacked" and sent back to operations. He believed that all Germany's efforts should be put into fighters; but says Hitler demanded an offensive air force to the end. Nevertheless, in September, 1944, after the "Big Week" of Allied raids, the German aircraft industry produced its peak of 4,103 aircraft, of which 3,013 were single-engined fighters. Apparently, even He.177 four-motor bombers were fitted with cannons and vertically-firing rockets to try and break up U.S. bomber formations.

The aircraft that might have swept the B-17's and B-24's from the skies—the Me.262 jet fighter—was first of all banned from production and then converted primarily into a

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bomber by Hitler's command. From Galland's account, it seems that we might have the Mosquito to thank for this deliverance. Its ability to outfly *Luftwaffe* fighters was a major concern to the *Fuhrer*, whose idea in ordering the Me. 262 "*blitz* bomber," was to have his own super-fast, invulnerable bomber.

Galland describes the *Luftwaffe's* changing tactics—the Wild Boar units which specialized in visual night-fighting operations; experiments with 50-mm. tank guns on the Me.410; the Storm-fighter wings of "volunteers" in specially armed Fw.190s; and the last, desperate plan to form vast numbers of He.162 *Volksjaeger* squadrons, piloted by 16 and 17-year-old Hitler youths. Fortunately for Germany, the war ended before that sacrifice could be made. J.W.R.T.

Faith, Hope and Charity. By Kenneth Poolman. (William Kimber & Co. Ltd., 46 Wilton Place, London, S.W.1. 200 pp. Illustrated. 15s.)

What a glorious antidote this is for the gloom and doom of Galland's book. It is as British as cricket and tea on the village green; for what other race would think it worthwhile—and rather good fun—to challenge the might of an enemy air force with a flight of ancient biplane fighters, give those fighters the improbable names of *Faith, Hope* and *Charity*, and then have the effrontery to shoot down some of the modernly equipped enemy?

Kenneth Poolman has done a fine job in assembling all known facts about the Gladiators of Hal Far's Station Fighter Flight, which formed Malta's sole air-defence force in the early summer of 1940. The result is full of surprises.

For example, there were four, not three Gladiators, although only three were airborne at one time. They were Sea Gladiators, belonging to the Navy; and no sooner was the Station Fighter Flight formed than the Admiralty wanted its aeroplanes back. Fortunately, this decision was soon countermanded; but the story of how the Gladiators were uncrated, crated and uncrated again in record time is one of the funniest in the book.

The chapters dealing with Malta's struggle for survival are far from funny. The Italian airmen were no cowards. Indeed, in the opinion of Flight Lieutenant Burges, one of the Gladiator pilots, "the average Italian pilot had more courage in the face of opposition than many of his *Luftwaffe* counterparts." But their guns were poor, "only about half their bombs went off, and those that did went 'pop' instead of 'bang.'" By comparison, the Gladiators were superbly manœuvrable, well armed and flown by men with the tremendous advantage of Royal Air Force training behind them. On the ground they were serviced and repaired so efficiently by the ground crews that the last of them remained in action long after Hurricanes and Spitfires arrived to carry on the fight.

Today, the battered fuselage of *Faith* remains in the armoury of the Palace of the Grand Masters in Valetta, as a proud reminder of the four biplanes that brought hope to Malta at the beginning of its ordeal fifteen years ago. In Mr. Poolman's words: "If they had not been there——— It is not difficult to imagine Mussolini in Valetta after all, and Axis aircraft and ships using Malta as the Allies used it later. The possible effects of such a calamity upon our situation in the Mediterranean and ultimately on the course of the whole war are very plain.

"But they *were* there, and in the end there was a victory."

J.W.R.T.

Crusader Fox King. By Ian Mackersey. (Robert Hale Ltd., London. 189 pp. May, 1955. 10/6 net.)

A fictional story of the loss of a civil airliner, flying from Australia to New Zealand. During the early stages of the flight, the author sketches a superficial picture of the principal people in the story, the passengers and the aircrew; leaving their true characters to come to light under the test of the tragedies and hardships which follow.

When over the Tasman Sea a propeller blade flies off the port inner engine of the Crusader aircraft, which slices into the fuselage, kills the Navigator and severs the rudder and elevator controls. Shortly afterwards the whole engine falls out into the sea below.

The Captain, hoping to reach a diversion airfield in New Zealand, trims his aircraft by having the now thoroughly alarmed passengers moved back and forth in the fuselage, by the help of a still calm and heroic Stewardess. Cut off from outside assistance by a dead radio, flying by instruments in clouds and later through rain and snowstorms, he finds at the point where landing becomes imperative that he is amidst snow capped mountains, with scrub, big rocks and snowdrifts only a few hundred feet below.

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Incidents arising during the survivors' period of isolation in the mountains include the discovery that one of the passengers is a smuggler and another a "lack of moral fibre" ex-pilot. A baby is born and further tragedies follow to both crew and passengers.

It is with considerable relief to the reader that the author introduces the arrival of the rescue party, led by a lone trapper who heard the aircraft pass over.

For those who enjoy this kind of thrilling fiction story the author provides a good pen picture of his characters and the country and builds up each tense situation, with one tragedy after another, in a manner which will hold their interest to the last page.

A.H.S.

NEW BOOKS

[Briefer Comment]

Airplanes of the World. By Douglas Rolfe and Alexis Dawydoff. (Simon & Schuster, Inc., New York. 320 pp. Fully illustrated. $2.95.) More than 1,000 drawings trace the development of the aeroplane from Leonardo da Vinci's man-powered ornithopter to the Sabre and Vulcan of today. Whatever your age, this book cannot fail to revive memories of half-forgotten aircraft. Mr. Rolfe's drawings include stick-and-string box-kites of the pioneer days; the vicious fighter-scouts and big biplane bombers of the 1914-18 War; the aircraft that made the great long-distance flights of the twenties; the air liners and racers of the thirties; the purposeful warplanes of the Second World War; and the efficient air liners and supersonic jets of the fifties. The chronological sections of drawings are linked with a 10,000-word review of aviation progress by Alexis Dawydoff.

The Greatest Airlift—The Story of Combat Cargo. By Captain A. G. Thompson. Obtainable from H.Q., 315th Air Division (Combat Cargo) A.P.O. 704, San Francisco, California, U.S.A. 464 pp. Fully illustrated. $3, plus $1.02 postage and insurance. This is a big book, illustrated by hundreds of photographs and telling the story of the biggest air transport operations in history. Many previous books have given glimpses of the vast air-lift of troops, supplies, vehicles and equipment carried out by the 315th Air Division during the Korean War. Here is the full story in one volume, showing the extent of the duties that a modern military transport wing may be called on to perform. They range from mass drops of parachute troops to scattering propaganda leaflets, "sky shouting" messages to the enemy, delivering a complete bridge in sections, evacuating casualties and, in less serious vein, judging Japanese beauties for the title of *"Miss Korean Airlift."*

Under Six Planets. By Winifred Brown. (Peter Davies, London. 273 pp. 15/- net.) Author of "Duffers of the Deep" and "No Distress Signals." In 1899 an astrologer drew up the horoscope of a newly born female child. (The preface gives this in detail). The book is the story of that child. The author having already made two particular episodes in her adventurous career the subjects of separate books now gives in effect the whole story of her life. What will perhaps be of most interest to readers of "Air Power" are the episodes in her career as a pilot, as she is the only woman to have won the King's Cup Air Race, which she achieved in 1930.

This is the self portrait of a rather exceptional woman. The daughter of a butcher of Manchester, a Lancashire lass who keeps nothing secret from her readers; to the more sensitive her outspokenness may verge on crudity at times, to others this book provides a variety of entertainment.

The Observer's Book of Weather. By Reginald M. Lester, F.R.Met.Soc. (Frederick Warne, London. Fully illustrated, 48 half-tones and 16 in colour. 152 pp. Pocket size, 5½ x 3½ in. 5/- net.) Written in non-technical language, it provides a very useful weather study, which is a topic of interest to all, be it for pleasure, flying or industry.

U.S. and Canadian Military Aircraft. By John W. R. Taylor (Ian Allan, London. 88 pp. Over 100 aircraft illustrated, most of which are accompanied by silhouettes. 2/6 net.) The aircraft are arranged in the alphabetical order of the manufacturer's name, followed by the primary letter of the type designation and to assist the uninitiated there are complete tables of all designations in present use. This most useful book includes all important types of current U.S. and Canadian military aircraft. There is an astonishing completeness of information for so small a book.

The Flight of Alcock and Brown. By Graham Wallace. (Putnam, London. 312 pp. 25 illustrations. 18/- net.) Of all the great pioneering flights that have marked man's conquest of the air, the first transatlantic "hop" by Alcock and Brown in 1919 must rank as one of the most heroic. This is a graphic story of the hazards of early flying and that these two men faced them across the Atlantic, sometimes brought down to within 50 feet of the trackless waves, leaves one with the impression that it was a miracle achieved by bravery. The full life stories of the two men who accomplished this amazing flight adds much to the interest of the book. Those who heard the brief broadcast of this flight not long ago have now the opportunity of reading the full story.

The Aeroplane Directory of British Aviation—1955 Edition. Compiled by the staff of The Aeroplane. (Temple Press, London, 582 pp. 21/- net.) This most useful Classified Directory is published annually. It is well indexed and guide cards with thumb tabs have been inserted, enabling the required section to be identified at a glance. It is a complete guide to aviation throughout the Commonwealth Nations, divided into nine parts: Service Aviation; Civil Ministries, etc.; Aviation Industry; Commercial Aviation; International Bodies; Professional Societies and Clubs; Aeronautical Press; Training; and Who's Who in British Aviation. It is an invaluable Directory for the reference library of all whose interests are in aviation.

Frontier to Space. By Eric Burgess, F.R.A.S., with a Foreword by the Astronomer Royal, Sir Harold Spencer Jones, M.A., Sc.D., F.R.S., F.R.A.S. (Chapman & Hall, London. 174 pp. 40 illustrations and numerous diagrams. 21/- net.) Before man can expect his aspirations for space flight to become more than dreams, he must have accurate information on conditions at the frontier of interplanetary space, in order that he will be able to predict the behaviour of vehicles moving at high speeds in the rarefied upper regions of the earth's atmosphere. This book gives an account of how modern rockets are enabling man to obtain this knowledge by ascending 242 miles. Suitably designed equipment in the nose cones have provided much new knowledge. "Frontier to Space" gives a connected account of the various fields of investigation, the methods employed and the results so far obtained. To serious students it is a book of absorbing interest.

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